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Asian Journal of Organic & Medicinal Chemistry

Special Issue

On

**Current Trend on Research in Applied Science,
Management and Technology**

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Design and Implementation of Virtual Mouse Using Hand Gesture Recognition

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ABSTRACT

Researchers around the world are now focused on to make our devices more interactive and trying to make the devices operational with minimal physical contact. In this research, we propose an interactive computer system which can operate without any physical keyboard and mouse. This system can be beneficial to everyone, especially to the paralyzed people who face difficulties to operate physical keyboard and mouse. We used computer vision so that user can type on virtual keyboard using a yellow-colored cap on his fingertip, and can also navigate to mouse controlling system. Once the user is in mouse controlling mode, user can perform all the mouse operations only by showing different number of finger. We validated both module of our system by a 52 years old paralyzed person and achieved around 80% accuracy on average

Keywords: Human Computer Interaction, Computer Vision, Gesture Control, Image Processing, Artificial Intelligence

1. INTRODUCTION

The uses of computers have become an integral part of our daily life and the human computer interaction are becoming more convenient in every day. While the majority of the people take these facilities for granted, people with physical impairments face many difficulties in properly using these devices. In particular, people with severe movement disabilities may have physical impairments which significantly limit their ability to control the fine motor. Therefore, they may not be able to type and communicate with a normal keyboard and mouse.

In this situation, it is important to use effective assisted technologies to ensure accessibility for such people. A wide range of eye-tracking devices are currently available commercially on the market, Offering many functionalities, accuracy level, and price range. Many research studies require eye-tracking devices of high precision to test a range of eye characteristics, but they are expensive such as infrared. In this work, we propose a novel multi-modal interactive keyboard and mouse system where we detect and track a color (yellow in this research) to replace the use of traditional keyboard and mouse using the device's camera. This is achieved by taking inputs from a camera using a vision-based color recognition technique and hand gesture recognition technique and without any additional hardware requirements.

The biggest issue of copyright infringement have imperil of worms and harmful programs to the software system which leads to damaging software reliability and data become unusable. The impact of crime has risen on the manufacturer agencies dramatically, reducing their effectiveness.

Our system will allow the user to operate their computer's keyboard and mouse using only their hand bearing a yellow color cap on their fingertip. The main objective of this research is to build an interactive keyboard and mouse system so that motion impaired people can communicate with the computer through its webcam using their one hand only.

OBJECTIVES ARE

- To detect a yellow-colored cap
- To recognize the key on which the cap is placed
- To track the movement of colored cap for mouse movement and
- To detect the number of fingers shown to determine left-button or right button click of the mouse.

The rest of the article is organized as follows: section II presents few related works on virtual keyboard and virtual mouse system; section III illustrates methodology, section IV discusses about the results of our study and finally, section V concludes our work and discusses about the future work.

2. RELATED WORK

Virtual Keyboard

In 2010, Y. Adajania et. al developed a Virtual Keyboard Using Shadow Analysis. This system detects keyboard, hands shadow, finger tips using color segmentation and sober technique. Ambient lighting conditions

required for this system. This system can analyze 3 frames per second. In 2011, S. Hernanto et al. built a method for virtual keyboard using webcam. In this approach, two functions are used for finger detection and location

An Interactive Computer System with Gesture-Based Mouse and Keyboard 3 detection. This system used two different webcams which are used to detect skin and location separately. The average time per character of this virtual keyboard is 2.92 milliseconds and the average accuracy of this system is 88.61%. In 2013, M. H. Yusuf et al. introduced a keystroke detection and recognition model using fingertip tracking. They captured real time movements of finger joints and successfully recognized 28 keys. In 2015, I. Patil et al. constructed a virtual keyboard interaction system using eye gaze and eye blinking. Their system first detects face and then detects eye and nose region to recognize an eye blink. The OpenCV java framework is used in this approach. In 160X120 frame size, this approach achieves 48% accuracy and in 1280X960 frame size, 98% accuracy is achieved

Virtual Mouse

In 2016, S. Shetty et al. constructed a virtual mouse system using color detection. They used webcam for detecting mouse cursor movement and click events using OpenCV built-in functions. A mouse driver, written in java, is required as well. This system fails to perform well in rough background. P. C. Shindhe et al. expanded a method for mouse free cursor control where mouse cursor operations are controlled by using hand fingers. They have collected hand gestures via webcam using color detection principles. The built-in function of Image Processing Toolbox in MATLAB and a mouse driver, written in java, used in this approach. The pointer was not too efficient on the air as the cursor was very sensitive to the motion.

Gupta al G. Sahu et al. built a system for controlling mouse pointer using webcam which control volume of media player, PowerPoint slides and can make or end a call. They used RGB color tapes to recognize user's finger. In 2019, K. Hassan et al. presented a system to design and develop a hand gesture based virtual mouse. They captured different gestures via webcam and performed mouse functions according to the gestures. This system achieved 78%-90% accuracy. The system does not work efficiently in the complex or rough background. As we can see from the reviewed literature, previous systems includes either virtual keyboard or virtual mouse

3. METHODOLOGY

We used an infinite loop to catch the frames in each instance by the web camera which will be available throughout the program. We capture the stream from An Interactive Computer System with Gesture-Based Mouse and Keyboard live feed, frame by frame and then convert RGB images to grayscale images. We create a mask here which recognizes hand's shape and then counts the number of fingers in the shape. We have used the law of cosine as expressed in equation (1) to find the angle in shape of hand. $c^2 = a^2 + b^2 - 2ab\cos(C)$. The mask creates some specific region of the image according to certain rules. Instead we draw contours from the mask. For object tracking, we loop through all the contours. Convex hull of a set X of points in any space is defined as the smallest convex set that contains X. Any deviation of the object from this convex hull can be considered as convexity defect. The convex hull of a finite point set S can be defined as the set of all convex combinations of its points. To find the contours in the image, we have used *cvFindContours* () function of OpenCV which uses an order finding method to detect edges. We are interested in extracting the hand contour in the contour extraction process so that shape analysis can be done to determine hand gestures. The hand contour convexity defects were measured using OpenCV's *cvConvexityDefects* () function. Convex hull of an object can be defined using the convex combination of all its points. Convexity defects are identified when there is any deviation of the object from its convex hull [9]. After the convexity defects are acquired, two major tasks are considered to determine mouse control functions:

- identifying fingertip and
- counting number of fingers from the number of convexity defects. We convert the detected coordinate from camera resolution to actual resolution of the screen. Mouse controlling module will perform in the following manner:
 - if it detects two fingers, it will move the mouse cursor in the four directions (left, right, up and down) according to the movement of the fingers, and An Interactive Computer System with Gesture-Based Mouse and Keyboard.
 - if it detects four fingers and five fingers, then *right button click* and *left button click* actions will be performed, respectively Figures 5, 6 and 7 demonstrate mouse cursor movement, left button click and right button click operations, respectively.

4. IMPLEMENTATION

A. Mouse Movements

At first, calculation of the centre of two detected colour objects which is done by the coordinates of the centre of the detected rectangle. To create a line between two coordinates, the built-in OpenCV function is used and to detect midpoint equation given below is used:

This midpoint is the tracker for the mouse pointer and the mouse pointer will track this midpoint. In this system, the coordinates from camera captured frames resolution is converted to screen resolution. A predefined location for the mouse is set, so that when the mouse pointer reaches that position, the mouse started to work and this may be called open gesture. This allows the user to control the mouse pointer.

B. Mouse Clicking

The proposed system uses close gestures for clicking events. When the rectangle bounding boxes

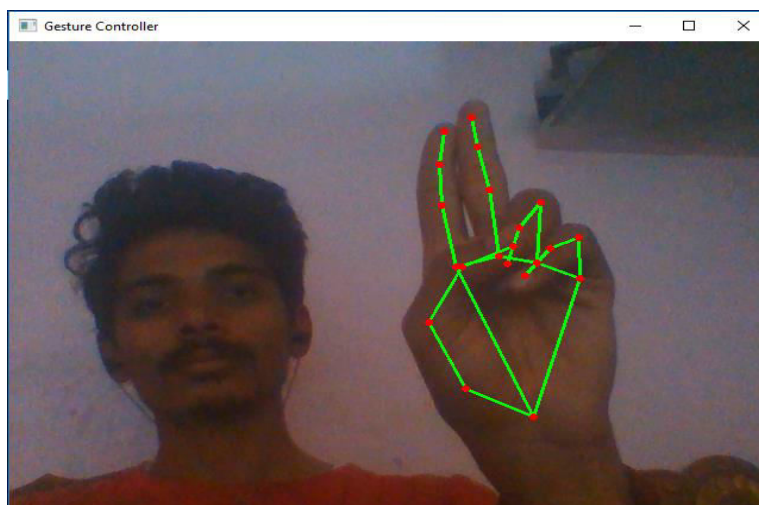


Fig 4: 1 Double Click

Closer to another rectangle, bounding box is created

With the edge of the tracking bounding boxes. To perform the right button click, the single finger is good enough. The system will detect one fingertip colour cap then it performs a right button click.

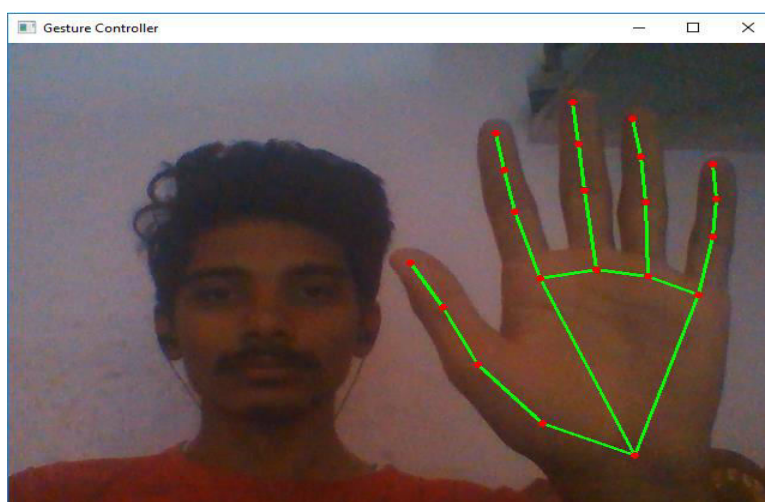


Fig 4.2: Neutral

C. Mouse Scrolling

To scroll with this system, user needs to use the open gesture movement with three fingers with colour caps. If the users use their three fingers together & changes its position to downwards, it will perform scrolling down. Similarly, if its position is changed to upwards, it will perform scrolling up. When three fingers move up or down the colour caps gets a new position and new coordinates. By the time all three colour caps get new coordinates, it performs scrolls. If their y coordinate values decrease, it will perform scrolling down and if the values increase, it will perform scrolling up.



Fig 4.3: Move



Fig 4.4: Left Click

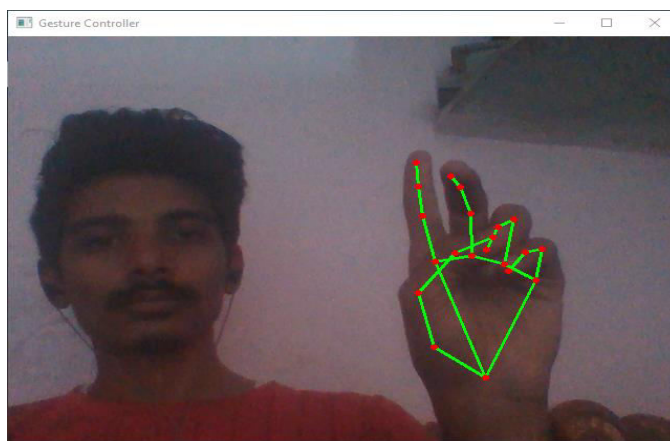


Fig 4.5: Right Click

And lastly users have to enter the unique key which is provided by the system to enter into the software.



Fig 4.6: Drag & Drop

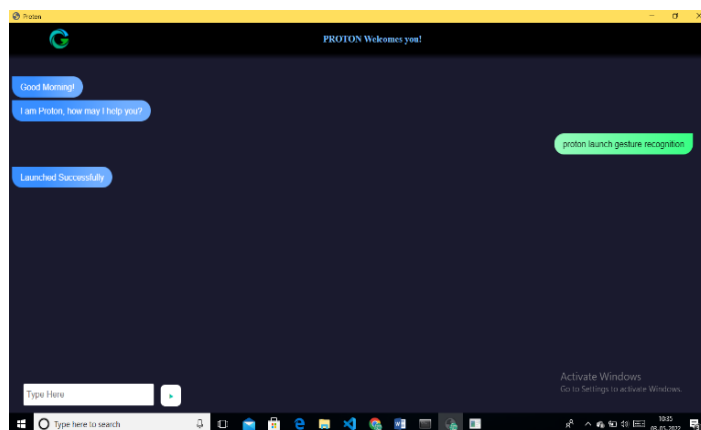


Fig 4.7: Proton

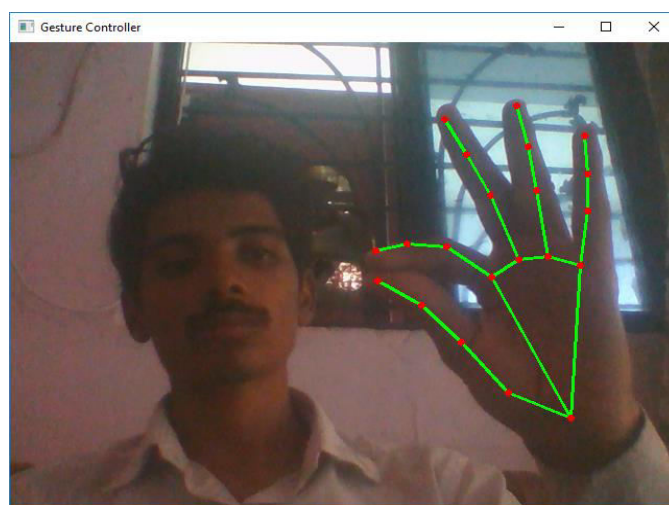


Fig 4.8: Scroll

5. FUTURE SCOPE

Keyboard and mouse actually form an integral part of the computer system. Our system architecture can facilitate the use of computer for the paralyzed people. We have developed a virtual system where people can communicate with the computer without using any physical keyboard and mouse. This could lead to a new age of Human Computer Interaction in which physical contact with the computer would not be necessary at all. The use of object detection and image processing in OpenCV for the implementation of our work has proved to be practically successful and the task of keyboard and mouse is achieved with good precision. This system can be beneficial to certain people who have no control over their limbs. Most of the applications require additional hardware which are often very expensive. The motive of this work is to create this technology as cheaply as possible and to create it under a standardized operating system as well. Though, our system can be used as an alternative for physical keyboard and mouse, it still may perform less accurately in a low light condition. This is a concern for further research. Moreover, the work can be extended for a wide variety of environments and can be tested using the sophisticated existing models.

6. CONCLUSION

Virtual gesture control mouse is a system that profound to guide the mouse cursor and execute its task using a real time camera. We implemented mouse navigation, selection of icons and its functions and tasks like left, right, double click and scrolling. This system is based on image comparison and motion detection technology to do mouse indicator movements and selection of the icon. Analyzing results, it can be anticipated that if we provide enough light, decent camera, the algorithms can work at any domain. Then our system will be more systematized. In future, we want to merge more features such as interaction in multiple windows, enlarging and shrinking windows, closing window, etc. by using the palm and multiple fingers

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An Artificial Intelligence Based Human Emotion Detection Using Android Application

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ABSTRACT

Sometimes, people feel like they are unable to express themselves while facing emotional stoop and also they want to share what is in their heart with someone, but they can't say this to anyone just for maintaining their privacy. They are also worried or stressed, but for one reason or another, they do not devote enough attention to their mental health. So for that we are going to provide a solution that will help people to discover the emotional roots to their problems. This system will help people to come out from trauma to some extent by acting like the one emotionally intelligent friend they wish they could have. This system will recognize the emotions of user and guide them properly based on their emotion. In the proposed system, emotion of a user is recognized whether it is happy, sad, angry or neutral and based on their emotions the system will guide them what can they do to switch the mood and feel good. In this system, user's emotion through face and voice will be detected. These expressions can be extracted from the system's camera's live feed. Human emotions can be recognised, and there is a huge field of study in the computer vision sector on which various studies have already been conducted. The scanned image (testing dataset) is being compared to train the dataset and thus emotion is predicted. After the emotion is predicated, online assistance will be provided based on the same. So the objective of this system is to detect emotions of people through their faces and voice. After detecting emotions, system will assist people based on their emotion to grow in every aspect.

Keywords: Deep Neural Network, Face Expression Configurations, OpenCv, Artificial Neural Networks.

I. INTRODUCTION

Nowadays, people don't get time to take care of their mental health. For maintaining a good mental health they need assistance. It's a short term, interpersonal, proposition grounded, and helping intention to someone. Its idea is to resolve development and situational difficulties. Assistance helps to bring change in life, feelings and actions. Assistance can be done to anyone after knowing expressions of that person. Emotion recognition is that the study of recognizing universal expressions using various computing techniques^[1]. Humans have the natural capability to use all their available senses for maximum observation of the received communication. The emotional discovery is natural for humans but it is veritably problematic task for machine. Thus the purpose of emotionspace online assistance system is to use emotion related knowledge in such a way that human machine communication will be improved^[2]. So for that we are going to make a system that will help people to discover the emotional roots to their problems to so extent. It will assist people in overcoming their trauma by acting as the emotionally intelligent buddy they wish they had.. Also, This System will recognize the emotions of user and guide them properly based on their emotion. In this system, emotion of a user is recognized whether it is happy, sad, angry or neutral and based on their emotions the app will guide them what can they do to switch the mood and feel good. In this project four basic emotions as shown in fig 1(Anger, Happy, Sad and Neutral) are detect from emotional speech signals^[3].

The flow of the proposed system will be: first user can see two different modules the first one is speech emotion recognition and second one is face emotion recognition. If user chooses speech, user has to say something and then emotion of that speech will be detected. If user choose face emotion recognition, system will collect the data through web cam and the processor will read the emotions frame by frame and after that it will convert the frame into the input shape module, it will run the module and record emotion that which facial emotion user give for recognition, and finally the program terminate and show the result of emotions recorded. After detecting emotion, assistance will be provided.

II. LITRATURE SERVEY

In this paper idea of the technology who recognised the emotions and according to that they mentioned it. There were no such system developed who recognised the emotions and also mentor it but there are alot of research who already work on emotion recognition and personal mentoring. What we know about human emotions is still very much limited. Some of the emotions recognition and mentoring work are already been done by many people world-wide. Kamran Soltani and group studied the importance of the psychology and linguistics. They work makes use of emotions like happy, sad, angry, neutral. The work concluded that angry and neutral can be recognised easily at the same time fear is hard to recognise. The paper consider of pre-processing of live feed via

system camera or any pre-existing system available in the memory for emotion recognition based on the use of artificial neural networks. Emotion are not only those felt by persons, persons also express them either compatibly or uncomfortably, which Martinez and Du stated as an engineering marvel as the face muscles are also provide us to produce many face expression configurations. These configurations could be set by proper training or by predetermined configurations, but only several emotion expressions could be well-recognized by persons.

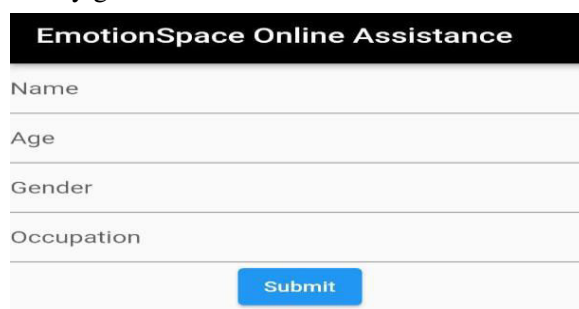
In recent times, mental health issues have come a major source of concern in our society due to the increases in its circumstance and the devastating effects it has on the individual and their loved ones. According to a World Health Organization – Mental Health survey, over 350 million people worldwide suffer from depression each year [12]. Health services can be made more accessible and engaging with the use of digital health tools.. Specifically, smartphones and other handheld mobile devices are a seductive platform for delivering internal health interventions because of their ubiquitous nature coupled with their increased capacity to reuse and handle a large quantum of data, deliver instant feedback, and share data with the healthcare providers and experimenters^[13].

There are numerous operations designed to support internal health issues. Popular exemplifications include apps that enable tone-monitoring of particular internal health – related data similar as mood14 and internal health games – grounded apps that help to manage anxiety and achieve healthy living^[14]. There are also numerous further apps available on the App Store and Google Play that are targeted at promoting internal health and diving colourful internal health issues. These apps use colourful ways including (1) shadowing and monitoring to ameliorate particular sapience about causes and symptoms of internal illness, (2) furnishing ways to alleviate and manage symptoms arising as a result of a internal health issue similar as breathing and contemplation, and (3) furnishing a social community where druggies can ask and/ or answer questions and find support. Although mental health apps have proven effective at reducing mental health issues, there are still high situations of drop-outs/ attrition. For illustration, Roepkeetal designed two performances of SuperBetter (SB) for depressed individualities, which can be penetrated via smartphone or website(first version SB uses cognitive-behavioral remedy (CBT) and positive psychotherapy strategies and the alternate version of SB focuses on tone- regard and acceptance of the present)^[5]. They conducted a study to compare the two performances of SuperBetter and plant that the interpretation grounded on CBT and positive psychology didn't perform better than the interpretation grounded on tone- regard and acceptance of the present. Still, the two performances of Super Better had high waste rates (roughly 21 of the sample completed the post-test for each of the performances). Also, Areatal conducted a study to compare three different tone- guided mobile apps for depression (cognitive control app, problem- working remedy app, and health tips app). For each intervention, they used reminders to notify the druggies about the new assessments. While results indicated that apps offering cognitive training and problem- working made a stronger impact on depressed mood, 74 percent of registered actors dropped out from the study. Despite the fact that the studies below had poor adherence, the outcomes in terms of lowering depressed mood appear to be positive. As a result, this paper contributes to advancing the state of the art by exploring the strengths and sins of publicly available mental health operations and also offers some recommendations for developing mental health app that will fulfil user's needs. Specifically, from our qualitative analysis of user reviews, we reveal which design factors are important for users and which factors impact user adherence.

III. IMPLEMENTATION

The entire system is divided into different sets of Modules each is design to perform a specific task/operation in execution.

When we open the system, the below form shown in fig.3.1 user has fill the details like name, age, gender. After clicking on submit button user's entry get store in the database.



EmotionSpace Online Assistance

Name

Age

Gender

Occupation

Submit

Fig 3.1: User Registration form

Home Page

After clicking on submit button, user get navigate to home page of the system as shown in below fig 3.1.1. Here user can see four different options, they are given below:



Fig 3.2: Home page

3.2.1 Upload an Image from the Gallery

The task of the module is acquiring a image from the gallery .For that we have use image picker plugin . The image picker plugin exposes some helpful method for the ImagePicker class. The picker instance has public methods that will call to open the image selection dialog. After that system calls to pick image method, the pick image method open the choose dialog and display the phone's gallery from which to select the image.The source arg states where the image is to be picked from. The source is set to ImageSource.gallery, so the image is selected from the user's gallery.



Fig 3.2.1: Image pick from gallery

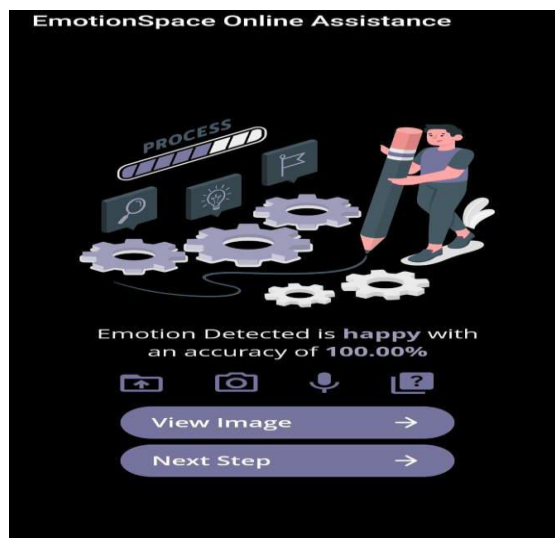


Fig 3.2.2: Emotion detection

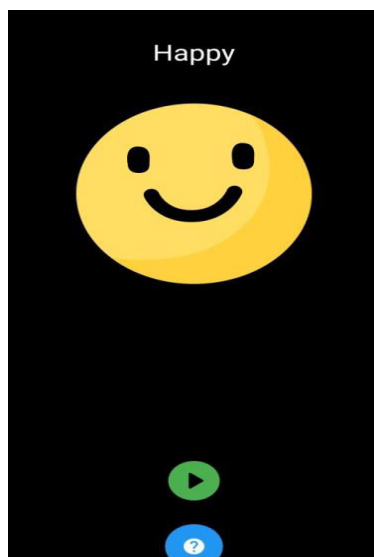


Fig 3.2.3: Give assistance based on emotion

3.2.2 Capture an Image

The task of the module is acquiring a image from taking picture through camera. The task is performed with the help of Tflitelibrary, as Tflite library provides a extensive support for capturing live image streams for camera. Tflite by default captures image at a specific resolution but this property can be changed by setting up the right parameters in the function call.



Fig 3.2.1: Image capture through webcam



Fig 3.2.2: Emotion detection

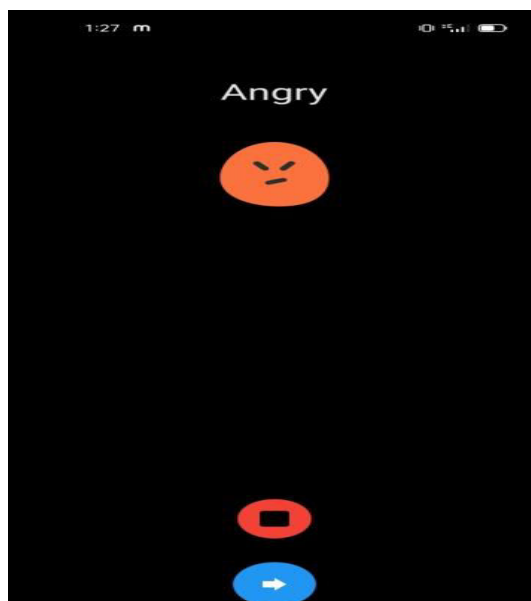


Fig 3.2.3: Give assistance based on emotion

3.2.3 Input Speech Capturing

The task is to recognize speech of user, for that we have initialized some bunch of different call back for the speech recognition object to work everything properly. We have used flutter_sound packages for recording audio. After recording of audio, the systems give assistance to user based on mood.

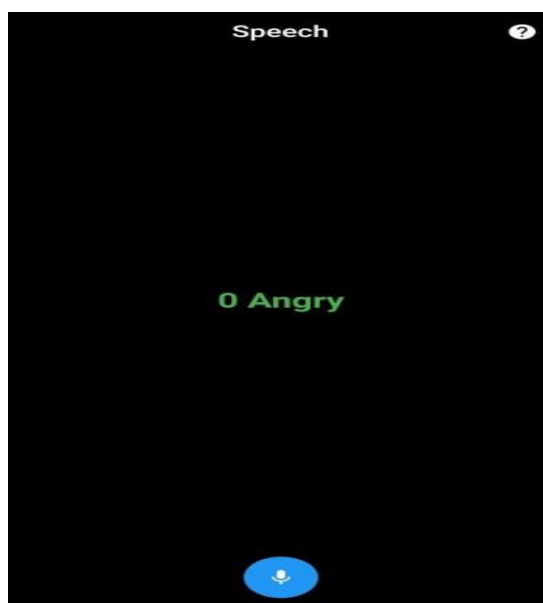


Fig 3.2.3: Detection of emotion through speech

3.2.4 Quiz

The Quiz.dart that has already imported main.dart file .In this file the class Quiz is begin defined which is used in the main.dart file. The question.dart file has already been imported into quiz.dart file, which uses the class Question. Answer.dart file was also imported in the quiz.dartfile. The file contains the Answer class which was use in the quiz.dart file .In the Answer class function ,selectHandelr And string answerText have been passed using the keyword final as they belong to stateful widget .The result.dart file had been imported in the main.dart file already as the class Result is defined in this file. Class result will not change in the app run cycle therefore it is a stateless widget. After that, we have the resulting logic which decided which remark would be shown after the quiz bases on the final score and last according to the score the app assist the user.

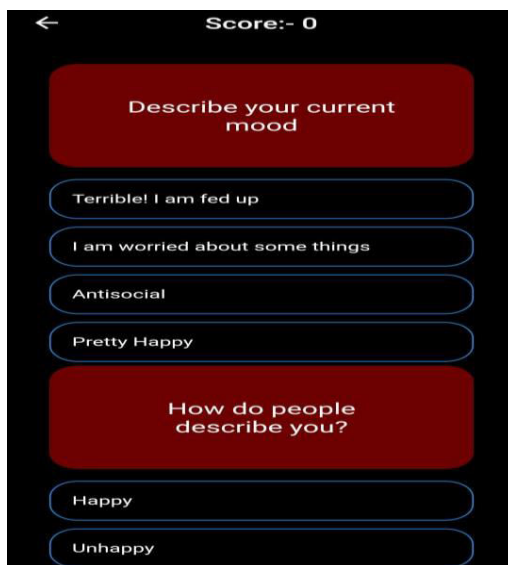


Fig 3.4.1: Quiz

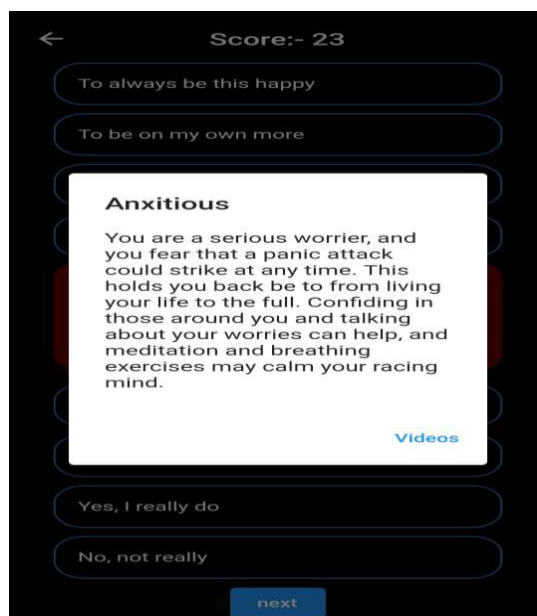
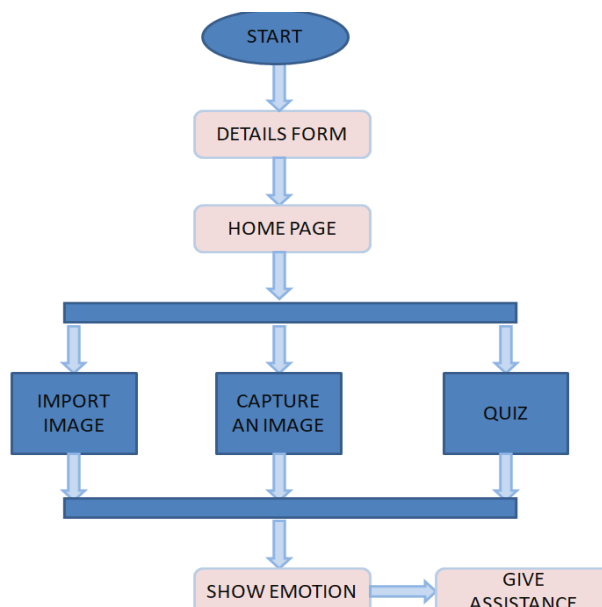


Fig 3.4.2: Assist after Quiz

IV. Flowchart



V. CONCLUSION

The application region of emotion recognition from face and speech is expanding as it opens the new measure of communication between human and machine. It is needed to model effective method of speech feature extraction so that it can even provide emotion recognition of real time speech and after that it will give guidance like what can do next for changing mood. We have developed a system that automatically recognizes facial expressions with subtle differences and also estimates expression intensity. Facial expressions of different types from a large number of untrained subjects have been tested. After detecting emotion, a proper guidance will give to users for switching their mood and feel good. So this purposed system will help users to get a proper guidance for changing their mood.

VI. FUTURE SCOPE

An engaging area for future work would be to research the comparative and relative effect of our identified app qualities on user engagement and determine why some qualities are moreover significant for adherence than others. It's also engaging to examine the relative effectiveness of various strategies used in apps with regard to promoting mental health.

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Brain Tumor Detection Based on Machine Learning Model

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ABSTRACT

The development of automatic methods for tumor identification using magnetic resonance imaging is one of the most actively explored fields in today's world. The medical industry has a difficult problem in the early and accurate detection of tumors. Automated systems are beneficial in the sense that they limit the possibility of human error during the tumor identification process. Many ways have been presented in recent years to accomplish this goal, but there are still many limits to these methodologies, and they have a significant amount of room to be improved further. This article gives a complete evaluation of such strategies for tumor detection that make use of a variety of image processing and deep learning techniques, among others. As well as discussing and drawing attention to certain important discoveries, the study also provides a road map for the future.

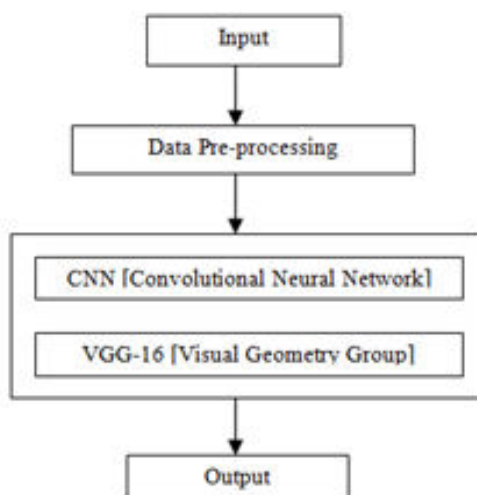
Keywords: Brain tumor segmentation, MRI, Machine learning, deep learning, Convolutional Neural Networks, U-net, Stack Auto encoder, Watershed Segmentation, Morphological Operations.

I. INTRODUCTION

A brain tumor is a disease caused due to the abnormal growth of mass in the brain. Normally in our body, new cells are produced which replace the old and damaged cells in a controlled manner. But in case of brain tumor, tumor cells go on multiplying uncontrollably. As per the National Brain Tumor Society nearly 70,000 people in United States are suffering from primary brain tumor. Brain tumor is ranked as 10th most common tumor in India. The presence of tumor is noticed by the Magnetic Resonance Imaging [MRI] scanning. The MRI scanning should be diagnosed by the physician and later based on the results; the treatments shall be started. This procedure can be a little time consuming. Hence to overcome this, the proposed work presents an automated system that will classify if the subjected patient is suffering from brain tumor. This system can assist the physician to make early decisions so that the treatments are carried out at an earlier stage. The proposed approach uses CNN and VGG-16 architecture and weights to train the model for this binary problem. Accuracy is used as the metric for evaluation. In the presented approach, we have augmented the dataset (MRI images of brain), performed certain data preprocessing steps to convert the raw data, further investigated two deep learning models namely CNN and VGG-16 and have presented the comparative analysis in the results section. Depending upon the algorithm complexity, computation time and other results one can choose any of the abovementioned algorithm in their work. This automatic detection system can assist the physician to make early decisions and hence start the treatments at an early stage.

II. OVERVIEW

The dataset considered consists of MRI scanned images of 253 patients out of which 155 of them are tumorous and 98 of them are non-tumorous. The presented work aims to develop a detection model that detects the tumour in the MRI scanned image of a patient. The detection model in general can be given as:



A. Input

It is assumed that the patient is all fit and capable to undergo an MRI scan as per the doctor's assistance. The present work considers the Brain MRI images of a patient as the input.

B. Data Pre-Processing

For the easy interpretation of the data, the data should be transformed from its raw state. The data pre-processing steps we considered are:

1. Importing libraries
2. Data augmentation
3. Import the augmented data
4. Convert the images to grayscale
5. Removal of noise using dilations and erosions and smoothing of images.
6. Grab the largest contour.
7. Find the extreme points of the contoured image
8. Resize the image
9. Crop the images using the extreme points
10. Splitting of dataset.

C. Algorithms Used

The algorithms used in the proposed work are:

1. Convolutional Neural Network [CNN].
2. VGG-16 Architecture.

D. Output

The system is trained to detect the tumour in the MRI of the patient and thus predict whether the patient is suffering from tumor.

III. LITERATURE REVIEW

Research work by 9 different authors has been discussed on the basis of varied deep learning techniques and architectures adopted by them.

Sakshi Ahuja et al., [1] used transfer learning and superpixel technique for detection of brain tumor and brain segmentation respectively. The dataset used was from BRATS 2019 brain tumor segmentation challenge and this model was trained on the VGG 19 transfer learning model. Using the superpixel technique the tumor was divided between LGG and HGG images. This resulted in an average of dice index of 0.934 in opposition to ground truth data.

Hajar Cherguif et al., [2] used U-Net for the semantic segmentation of medical images. To develop a good convoluted 2D segmentation network, U-Net architecture was used. BRATS 2017 dataset was used for testing and evaluating the model proposed. The U-Net architecture proposed had 27 convolutional layers, 4 deconvolutional layers, Dice coef of 0.81.

Chirodip Lodh Choudhury et al., [3] made the use of deep learning techniques involving deep neural networks and also incorporated it with a Convolutional Neural Network model to get the accurate results of MRI scans. A 3-layer CNN architecture was proposed which was further connected to a fully Connected Neural Network. F-score equal to 97.33 and accuracy equal to 96.05% was achieved.

Ahmad Habbie et al., [4] MRI T1 weighted images were taken and using semi automatic segmentation analyzed the possibility of a brain tumor using an active contour model. The performance of morphological active contour without edge, snake active contour and morphological geodesic active contour was analyzed. MGAC performed the best among all three as suggested by the data.

Neelum et al., [5] used a concatenation approach for the deep learning model in this paper and the possibility of having a brain tumor was analyzed. Pre trained deep learning models which are Inception - v3 and DenseNet201 were used to detect and classify brain tumors. Inception - v3 model was pre trained to extract the features and these features were concatenated for tumor classification. Then, the classification part was done by a softmax classifier.

Ms. Swati Jayade et al.,[6] used Hybrid Classifiers. The classification of tumors was done into types, malignant and benign. Feature dataset here was prepared by Gray level Cooccurrence Matrix (GLCM) feature extraction method. A hybrid method of classifiers involving KNN and SVM classifiers was proposed to increase efficiency.

Zheshu Jia et al., [7] the author made a fully automatic heterogeneous segmentation in which SVM (Support Vector Machine) was used. For training and checking the accuracy of tumor detection in MRI images, a classification known as probabilistic neural network classification system had been used. Multi spectral brain dataset is used and this model focused on the automated segmentation of meningioma.

DR. Akey Sungheetha, DR. Rajesh Sharma R.[8] used Gabor transform along with the soft and hard clustering for detecting the edges in the CT and MRI images. A total of 4500 and 3000 instances of MRI images and CT were used respectively.

IV. METHODOLOGY

4.1.1 Different Modules to Be Used in Our Project

1. Read Dataset
2. Pre-Processing
3. Feature Extraction

I. HU moments

II. Haralick

III. Histogram

IV. Data Normalization

4. Classification

I. SVM (Support Vector Machine)

II. Random Forest

III. Linear Regression

4.1.2 Analysis and Description of our System

1. **Read Dataset:** - The most important phase of the system, the data that have been acquired during research plays a very vital role as the accuracy, efficiency and performance depends on the real world row data.
 2. **Pre-Processing:** The main objective of the pre- processing is to convert the incomplete and inconsistent real world data into feasible data for analysis for achieving better result.
 3. **Segmentation:** The separating and studying of an individual pixel in an image so as to identify each pixel uniquely through their pixel values is known assignment. This step is carried out to extract the features of the image through the pixel values.
 4. **Feature Extraction:** After the image has been segmented, we extract the feature of the image through the pixels value of the image. Dimensionality reduction is a method which reduces the initial set of raw data into non-redundant and more relevant information.
- I. Hu Moments:-** Hu Moments are used to characterize the outline or “silhouette” of an object in an image. Normally, we obtain this shape after applying some sort of segmentation (i.e. setting the background pixels to black and the foreground pixels to white). Thresholding is the most common approach to obtain our segmentation.

After we have performed thresholding we have the silhouette of the object in the image. We could also find the contours of the silhouette and draw them, thus creating an outline of the object. We can still apply the Hu Moments shape descriptors provided that we obtain consistent representations across all images

OpenCV Shape Descriptor: Hu Moments Example

```
>>> import cv2
>>> image = cv2.imread("image_name.png")
>>> image = cv2.cvtColor(image,
cv2.COLOR_BGR2GRAY)
```

The first thing we need to do is import our cv2 package which provides us with our Open CV bindings. Then, we load our diamond image off disk using the cv2.imread method and convert it to Greyscale. We convert our image to Greyscale because Hu Moments requires a single channel image the shape quantification is only carried out among the white pixels.

From here, we can compute our Hu Moments shape descriptor using Open CV:

```
Open CV Shape Descriptor: Hu Moments
Example

>>>
cv2.HuMoments(cv2.moments(image).flatten() array([ 6.53608067e-
04, 6.07480284e-16, 9.67218398e-
18,
          1.40311655e-19, -1.18450102e-37,
          8.60883492e-28,
          -1.12639633e-37]))
```

In order to compute our Hu Moments, we first need to compute the original 24 moments associated with the image using cv2. Moments. From there, we pass these moments into cv2.HuMoments, which calculates Hu's seven invariant moments. Finally, we flatten our array to form our shape feature vector. This feature vector can be used to quantify and represent the shape of an object in an image.

I. Haralick: - Haralick texture features are calculated from a Gray Level Co-occurrence Matrix, (GLCM), a matrix that counts the co-occurrence of neighboring gray levels in the image. The GLCM is a square matrix that has the dimension of the number of gray levels N in the region of interest (ROI) These are texture features, based on the adjacency matrix (the adjacency matrix stores in position (i,j) the number of times that a pixel takes the value i next to a pixel with the value j. Given different ways to define next to, you obtain slightly different variations of the features. Standard practice is to average them out across the directions to get some rotational invariance. Gray Level Co-occurrence matrix (GLCM) uses adjacency concept in images. The basic idea is that it looks for pairs of adjacent pixel values that occur in an image and keeps recording it over the entire image. Below figure explains how a GLCM is constructed.

As you can see from the above image, gray-level pixel value 1 and 2 occurs twice in the image and hence GLCM records it as two. But pixel value 1 and 3 occurs only once in the image and thus GLCM records it as one. Of course, I have assumed the adjacency calculation only from left-to-right. Actually, there are four types of adjacency and hence four GLCM matrices are constructed for a single image. Four types of adjacency are as follows.

- Left-to-Right
- Top-to-Bottom
- Top Left-to-Bottom Right
- Top Right-to-Bottom Left

Histogram: A histogram is basically used to represent data provided in a form of some groups. It is accurate method for the graphical representation of numerical data distribution. It is a type of bar plot where X-axis represents the bin ranges while Y-axis gives information about frequency.

I. Data Normalization: - Normalization refers to rescaling real-valued numeric attributes into a 00 to 11 range.

Data normalization is used in machine learning to make model training less sensitive to the scale of features. This allows our model to converge to better weights and, in turn, leads to a more accurate model. Normalization makes the features more consistent with each other, which allows the model to predict outputs more accurately. Normalization refers to rescaling real-valued numeric attributes into a 00 to 11 range. Data normalization is used in machine learning to make model training less sensitive to the scale of features. This allows our model to converge to better weights and, in turn, leads to a more accurate model.

ML Classification:- Classification categorizing given set of reduced data set into specific class to identify which class a new observation belongs. Tried three ML algorithms: LogisticRegressor (LR), RandomForest Classifier (RFC) and Support Vector Machine(SVM), RFC performed best (close to 50% for raw pixels and 60% accuracy / precision for global features). We are downloaded some images from the web and tried to predict and the model got most of it right with global features trained model, but pretty poor with the local features. The models can be refined and improved by providing more samples (full dataset is around 500 MRI images), more features and combining both global and local features for increasing your model performance.

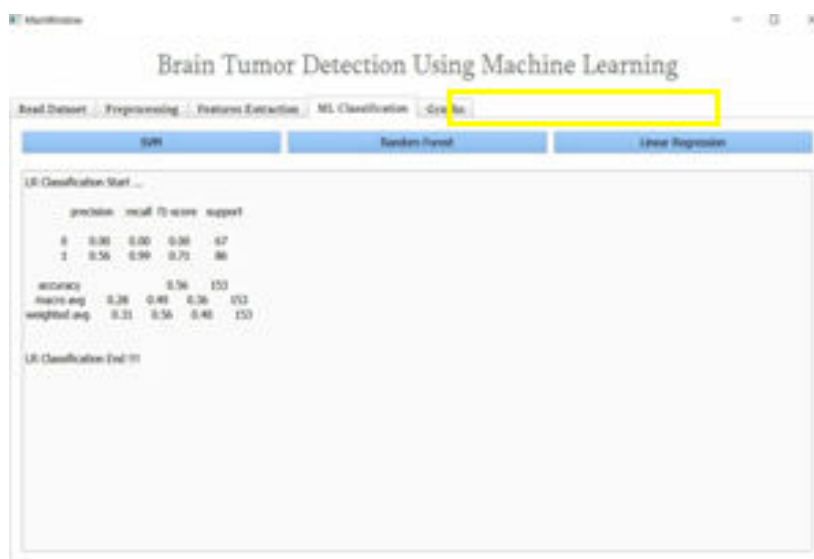
Following Algorithm methods are used in our system is:

1) SVM (Support Vector Machine)

SVM is one of the classification technique applied on different fields such as face recognition, text categorization, cancer diagnosis, glaucoma diagnosis, microarray gene expression data analysis [15]. SVM utilizes binary classification of brain MR image as normal or tumor affected. SVM divides the given data into decision surface, (i.e. a hyper plane) which divides the data into two classes. The prime objective of SVM is to maximize the margins between two classes of the hyper-plane [16]. Dimensionality reduction and precise feature set given as input to the SVM on the duration of training part as well as during the testing part. SVM is based on binary classifier which employs supervised learning to provide better results.

The working of the SVM algorithm can be understood by using an example. Suppose we have a dataset that has two tags and the dataset has two features x_1 and x_2 . We want a classifier that can classify the pair(x_1 , x_2) of coordinates in either diamond or circle. Consider the below image:

6.1.1 Linear Regression



Linear regression algorithm shows a linear relationship between a dependent (y) and one or more independent (x) variables, hence called as linear regression. Since linear regression shows the linear relationship, which means it finds how the value of the dependent variable is changing according to the value of the independent variable.

Mathematically, we can represent a linear regression as: $y = a_0 + a_1x + \epsilon$

Y = Dependent Variable (Target Variable)

X = Independent Variable (predictor Variable)

a_0 = intercept of the line (Gives an additional degree of freedom)

a_1 = Linear regression coefficient (scale factor to each input value). ϵ = random error

$$\text{Accuracy} = \frac{\text{True positive} + \text{True Negative}}{(\text{True positive} + \text{False Negative} + \text{True Negative} + \text{False Positive})}$$

Contour refers to the boundary or the outline of a shape.

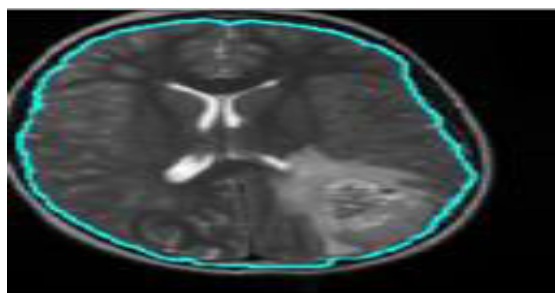


Fig 5: Find the largest contour

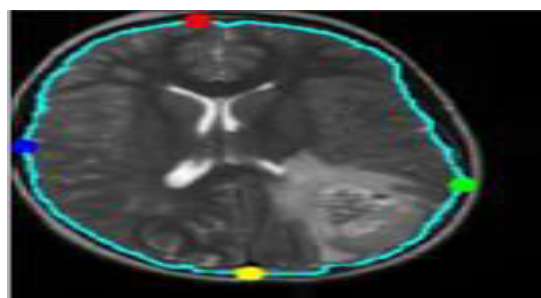


Fig 6: Extreme points of contoured image VGG-16.

Convolutional Neural Network (CNN)

Each layer in a CNN applies a different set of filters, typically hundreds or thousands of them and combines the results, feeding the output into the next layer in the network. During training, a CNN automatically learns the values for these filters.

CNN gives us two key benefits.

1. **Local variance:** The concept of local invariance allows us to classify an image as containing object regardless of where in the image the object appears.

We obtain this local invariance through the usage of “pooling layers” which identifies regions of our input volume with a high response to a filter.

2. **Compositionality:** Each filter composes a local path of lower level features into a higher-level representation; this composition allows our network to learn more rich features deeper in network.

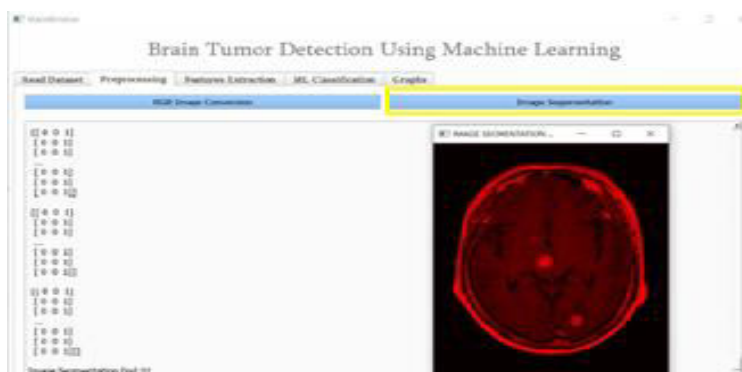
Kernel: A kernel can be visualized as a small matrix that slides across, from left to right and top to bottom of a large image. At each pixel in the input image, the neighborhood of the image is convolved with the kernel and the output is stored.

Example: Convoluting (denoted mathematically as * operator) a 3x3 region of an image with a 3x3 kernel.

$$O_{ij} = \frac{1}{9} \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix} * \begin{bmatrix} 93 & 139 & 101 \\ 26 & 252 & 196 \\ 135 & 230 & 18 \end{bmatrix}$$

$$= \begin{bmatrix} 10.3 & 15.4 & 11.2 \\ 2.6 & 28.0 & 21.7 \\ 15.0 & 25.5 & 2.0 \end{bmatrix}$$

$$= 132$$

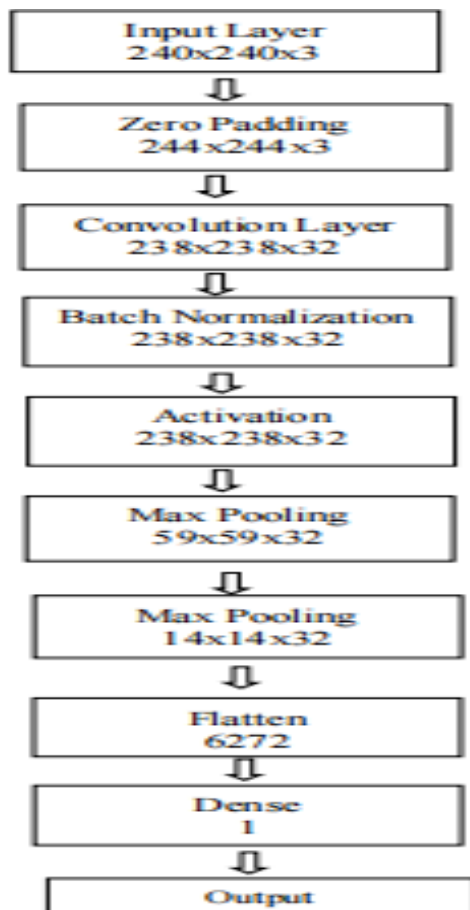


After applying this convolution, the pixel located at the coordinate (i, j) of the output image O to is set to $O_{ij}=132$. By

Applying convolutions filters, nonlinear activation functions, pooling and back propagations, CNN's are able to learn filters that can detect edges and blob like structures in lower level layers of the network and then use the edges and structures as

“Building blocks”, eventually detecting high level objects in the deeper layer of the network.

The flow graph of Convolutional Neural Network



1. Input Layer:

We have resized the images to 240x240 pixels

Height=240pixels and width=240 pixels with depth=3 [number of channels of the image]

2. Zero Padding:

We need to “pad” the borders of an image to retain the original image size when applying a convolution. The same is true for filters inside a CNN. Using zero, we can “pad” our input along the borders such that output volume size matches input volume size. We have performed zero padding on our images using pool size (2,2).

Example: Consider an image represented in the form of matrix:

95	242	186	152	39
39	19	220	153	180
5	247	212	59	46
46	77	133	110	79
156	35	79	93	116

Fig 9: A 5x5 image in its matrix form

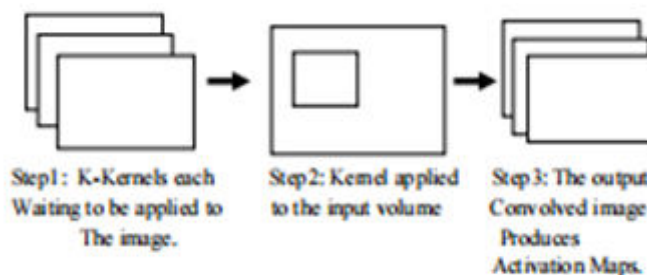
Padding the image with zeroes i.e. of pool size (2,2)

0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	95	242	186	152	39	0	0
0	0	39	19	220	153	180	0	0
0	0	5	247	212	59	46	0	0
0	0	46	77	133	110	79	0	0
0	0	156	35	79	93	116	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

Fig 10: Zero padding applies to image

3. Convolution

The convolution layer is considered as the core building block of a “Convolutional Neural Network”. The convolution layer parameter consists of a set of K learnable filter (i.e. kernels). Consider the forward pass of the CNN



In the convolution layer of our presented work, we have used 32 filters of size (7,7). The size (7,7) refers to receptive field [local region of input volume to which each neuron is connected]. We have used (7x7) receptive field, i.e. each neuron will connect to a 7x7 local region by the image for a total 7x7x3 =147 weights. After applying all 32 filters to the input volume, we now have 32, 2- dimensional activation maps. Every entry in the output volume is thus an output of a neuron that “looks” at only a small region of an input. In this manner the network “learns” filters that activate when they see a specific type of feature. After the convolution operation, the size of image is now (238, 238,32) depth has increased due to the filter used.

$$\mu_{\beta} = \frac{1}{M} \sum_{i=1}^m x_i \quad (2)$$

$$\sigma_{\beta}^2 = \frac{1}{M} \sum_{i=1}^m (x_i - \mu_{\beta})^2 \quad (3)$$

Stride: we have used the stride values s=1

Example: Consider an Image being convolved with Laplacian Kernel with stride=1.

95	242	186	152	39
39	19	220	153	180
5	247	212	59	46
46	77	133	110	79
156	35	79	93	116

Fig 9: Image

0	1	0
1	-1	1
0	1	1

Fig 10: Laplacian kernel

Using s=1, our kernel slides from left to right and top to bottom, one pixel at a time producing the below output,

692	-315	-6
-680	-194	305
153	-59	-86

Fig 11: The resultant matrix

Batch normalization: Batch normalization layers (or BN in short) as the name suggests, are used to normalize the activation of a given input volume before passing it into next layers in network. If we consider x to be our mini batch of activation, then we can compute the normalized via the following equation.

$$\hat{x}_i = \frac{x_i - \mu_B}{\sqrt{\sigma_B^2 + \epsilon}} \quad (1)$$

During training, we compute the μ and σ over each mini batch \square , where

We set ϵ equal to a small positive value to avoid taking the square root of zero. Applying this equation implies that the activation having a batch normalization layer will have approximately zero mean and unit variance. Batch normalization also has the added benefits of helping “stabilize” training, allowing for a larger variety of learning rates and regularization strengths.

4. Activation

After convolution layer, we have applied a nonlinear activation function. An activation layer accepts an input volume of size $W_{input} \times H_{input} \times D_{input}$ and then applies the activation function (below fig). Since the activation function is applied in an element wise manner, the output of an activation layer is always same as input dimension,

i.e., $W_{input} = W_{output}$, $H_{input} = H_{output}$, $D_{input} = D_{output}$.

Example: Consider an image to which RELU activation with $\max(0, x)$ function applied

-249	-91	-37
250	-134	101
27	61	-153

Fig 12: An example image

0	0	0
250	0	101
27	61	0

Fig 13: Resultant matrix

5. Pooling layers

There are two methods to reduce the size of an input Volume. \times Convolutional layers with stride >1 POOL layers The primary function of the POOL layers is to progressively reduce the spatial size (i.e. width and height) of the input volume. Doing this allows us to reduce the amount of parameters and computation in the network. Pooling also helps us control over fitting. We have used Max function in the pooling layer i, e Maxpooling with the pool size of $F \times S$ i.e. [receptive field size into stride]. Applying the pooling operation yields an output volume of size $W_{output} \times H_{output} \times D_{output}$, Where W_{output}

$$= ((W_{input} - F) / S) + 1 \quad H_{output}$$

$$= ((H_{input} - F) / S) + 1 \quad D_{output}$$

$$= D_{input}$$

Example: Consider an image to which a max pooling of pool size (2x2) is applied with stride=1 Fig14: Input image matrix Fig 15: Resultant Matrix in the presented work in CNN, we have used 2 max Pooling layers with pool size 4x4 and stride=1.

6. Flatten

This layer is used in order to flatten 3-dimension matrix to 1-dimension matrix. In the presented work, after flatten layer the array size obtained is 6272.

7. Dense

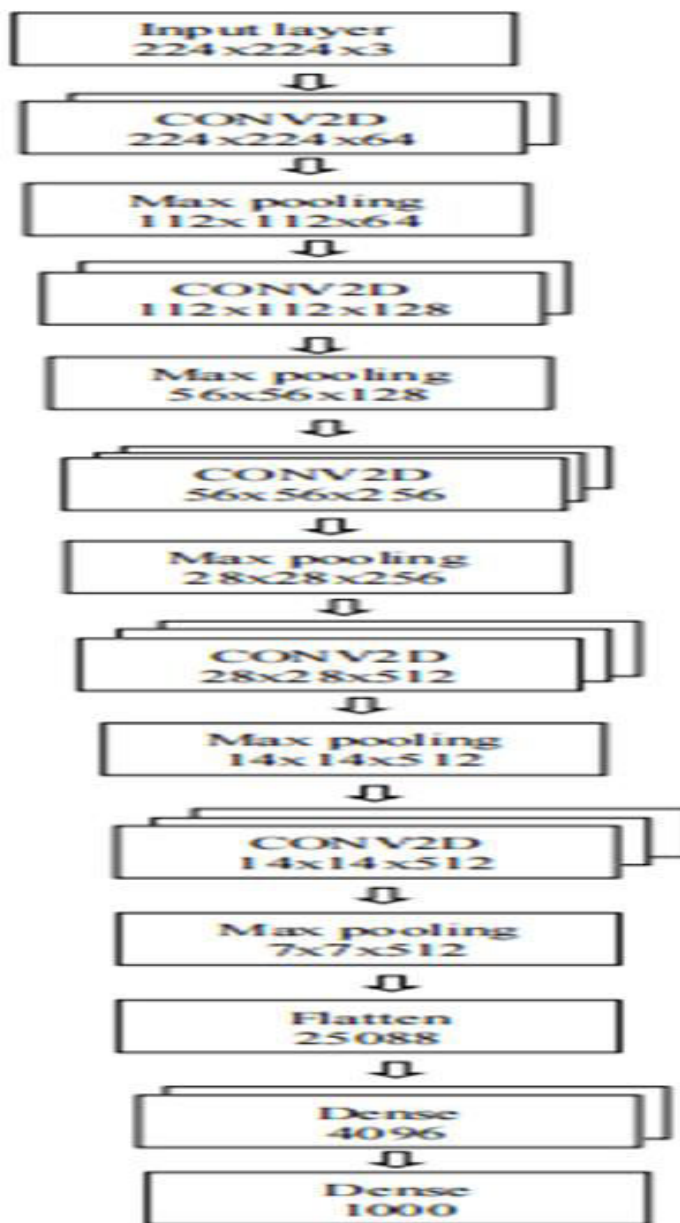
Dense is an output unit. It is fully connected with one neuron with sigmoid activation as we have binary problem of detecting brain tumor detection. If dense output is 1 then it indicates tumorous MRI. If dense output is 0 then it indicates non tumorous MRI.

C. VGG-16 ARCHITECTURE

The VGG network was introduced by Simonyi and Zisserman in this 2014 paper, “Very deep convolutional network for large scale image recognition”.

The VGG family of Convolutional Neural Networks can be characterized by two key points:

1. All convolution layers in the network use only 3X3 filters.



2. Stacking multiple convolution + RELU layer sets (the number of consecutive convolution layers+ RELU layers normally increases the deeper we go) before applying a pool operation. In the presented work, we haven't used the transfer learning technique, instead we have built the VGG-16 architecture and made the necessary changes in the architecture to have the better accuracy. The architecture of VGG-16 architecture used is given by

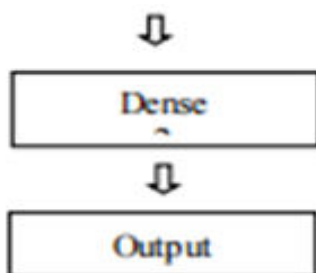


Fig 16: Flow graph of VGG-16 Architecture

V. RESULT AND ANALYSIS

The comparative results after using the same dataset on CNN model and VGG-16 architecture are as shown below.

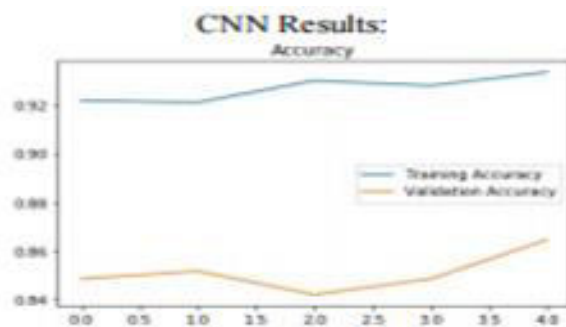


FIG 17: Accuracy chart

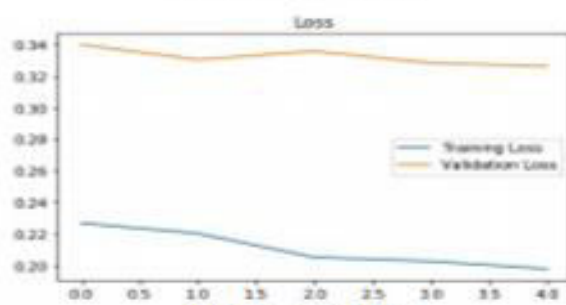


Fig 18: Loss chart

From the above plots of results, it can be inferred that: x The accuracy obtained is 93 percent with validation accuracy equal to 86 percent. This accuracy is obtained at the 23rd epoch of the training. VGG-16 Results: From the VGG-16 result plots below one can infer that: x

All though the accuracy rate is increasing up to 100

percent (Fig 20), we have estimated the best model at 17th epoch which yields 97.16 percent training accuracy and 97.42 percent validation accuracy as after the 17th epoch, although the accuracy was increasing, validation accuracy was gradually decreasing.

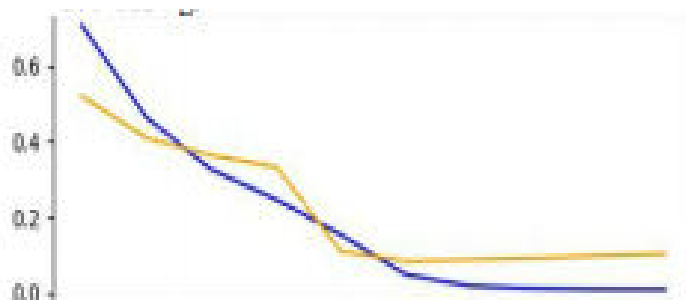


Fig 19: Loss chart

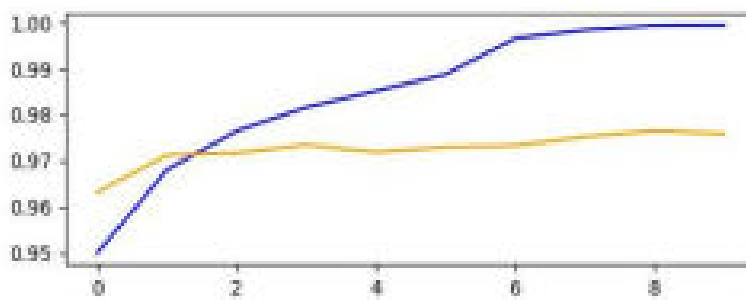


Fig 20: Accuracy chart

In fig 19 and 20 blue color refers to Training loss and Training accuracy and orange lines represent Validation loss and Validation accuracy.

Table 1: Parameter wise comparison

Parameter	CNN	VGG-16
No. of images used	2065 Training-1445 Test-310 Validation- 310	
Time consumed [From pre-processing till obtaining results]	0:5:03 [5mins: 3secs] GPU (GOOGLE COLAB)	0:15:25 [15mins:25secs] GPU (GOOGLE COLAB)
Epochs carried out	25	
Accuracy	0.9336	0.9716
Validation Accuracy	0.8645	0.9742
Test set accuracy	0.916	0.919

VI. CONCLUSION

In proposed work, Deep neural networks such as CNN and VGG-16 are investigated on MRI images of Brain. Both the models have given an effective result, However VGG-16 takes a greater computational time and memory but has given satisfactory results compared to CNN. Due to the availability of huge data being produced and stored by the medical sector, Deep learning will play an important role in data analysis in the upcoming days.

VII. FUTURE SCOPE

In brain tumor detection we have studied feature-based existing work. In feature-based we have study about image processing techniques like image pre-processing, image segmentation, features extraction, classification.

Also, study deep learning techniques SVM and VGG16. In this system, we have detected the tumor is present or not if the tumor is present then the model return's yes otherwise it return no.

We have compared SVM with the VGG 16 Model. The result of comparison VGG 16 is more accurate than other algorithms.

However, not every task is said to be perfect in this development field even more improvement may be possible in this application.

6.1 GRAPHS

6.1.1 Comparison Accuracy Graphs

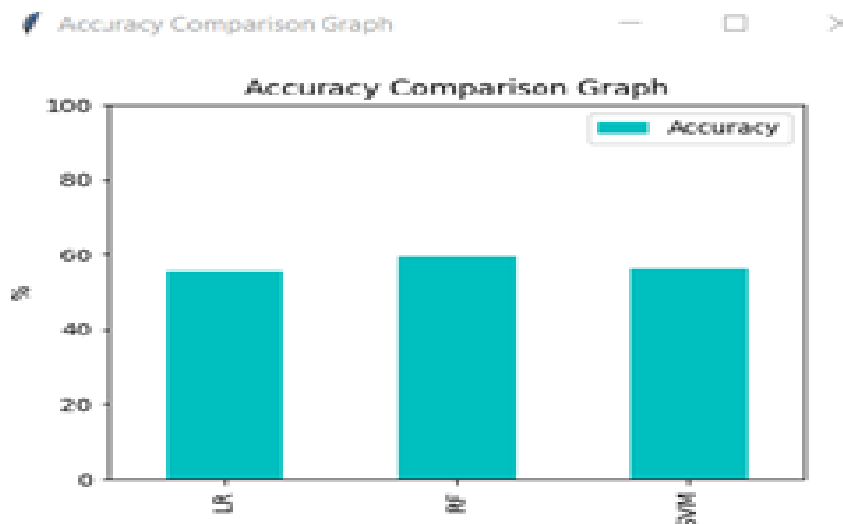


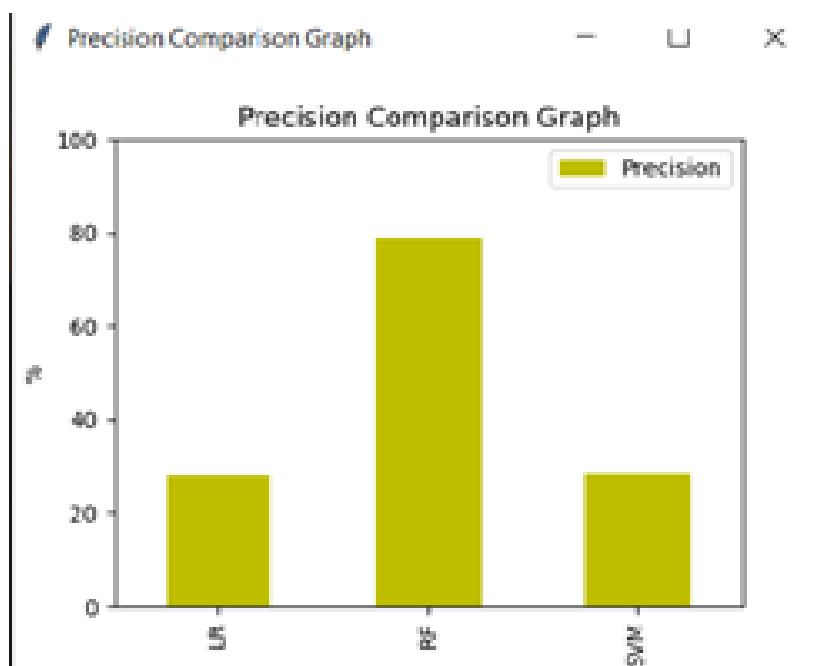
Fig. 6.6.1: Accuracy Comparison Graph

Accuracy Comparison Graph: One of the more obvious metrics, it is the measure of all the correctly identified cases. It is most used when all the classes are equally important.

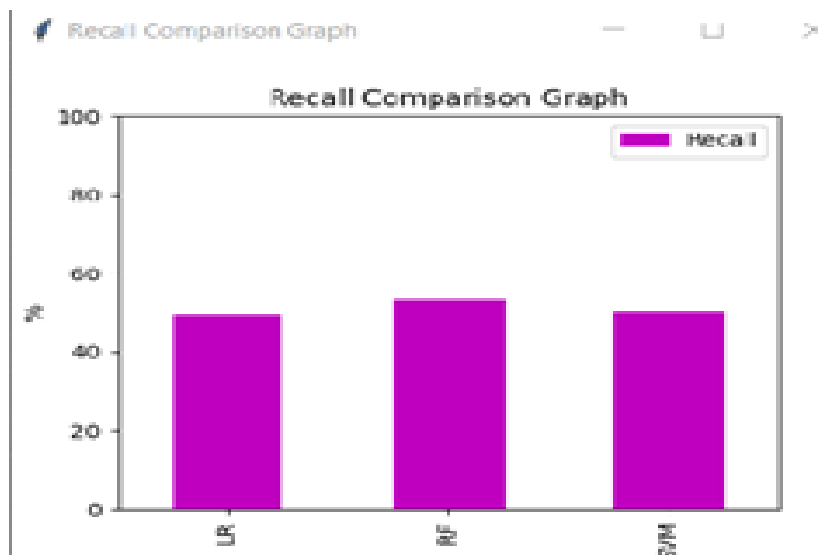
Calculation Formula:

$$\text{Precision} = \frac{\text{True positive}}{(\text{True positive} + \text{False Positive})}$$

6.1.2 Precision Comparison Graph: It is implied as the measure of the correctly identified positive cases from all the predicted positive cases. Thus, it is useful when the costs of False Positives is high



6.1.3 Comparison Recall Graphs

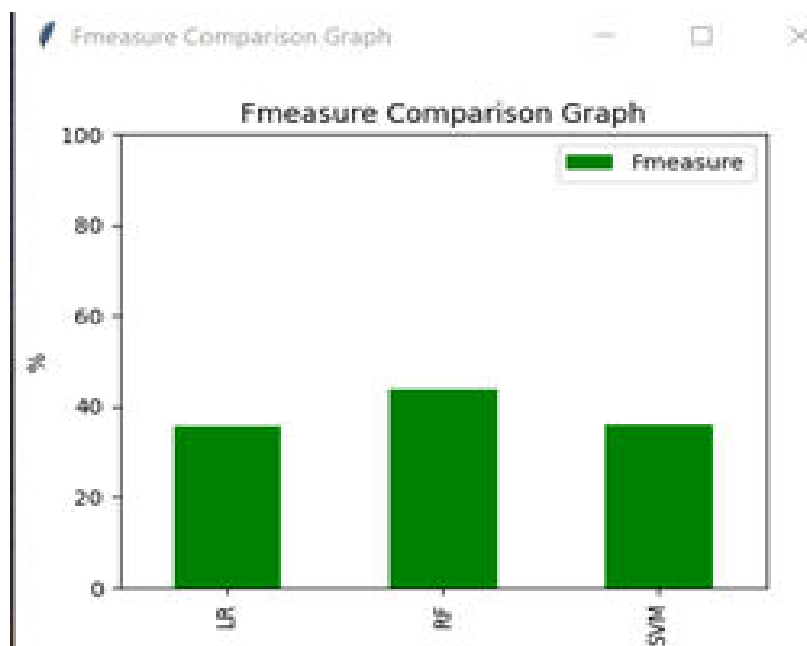


Recall Comparison Graph: It is the measure of the correctly identified positive cases from all the actual positive cases. It is important when the cost of False Negatives is high.

Calculation Formula:

6.1.4 Comparison F-Measure Graphs

$$\text{Recall} = \frac{\text{True Positive}}{(\text{True positive} + \text{False Negative})}$$



F-Measure Comparison Graph: F-measure is a single measure of classification procedure's usefulness. F-measure considers both the precision and the recall of the procedure to compute the score. The higher the f-measure the better the predicative power of the classification procedure. A measure of 1 means the classification procedure is perfect. The lowest position f-measure is 0.

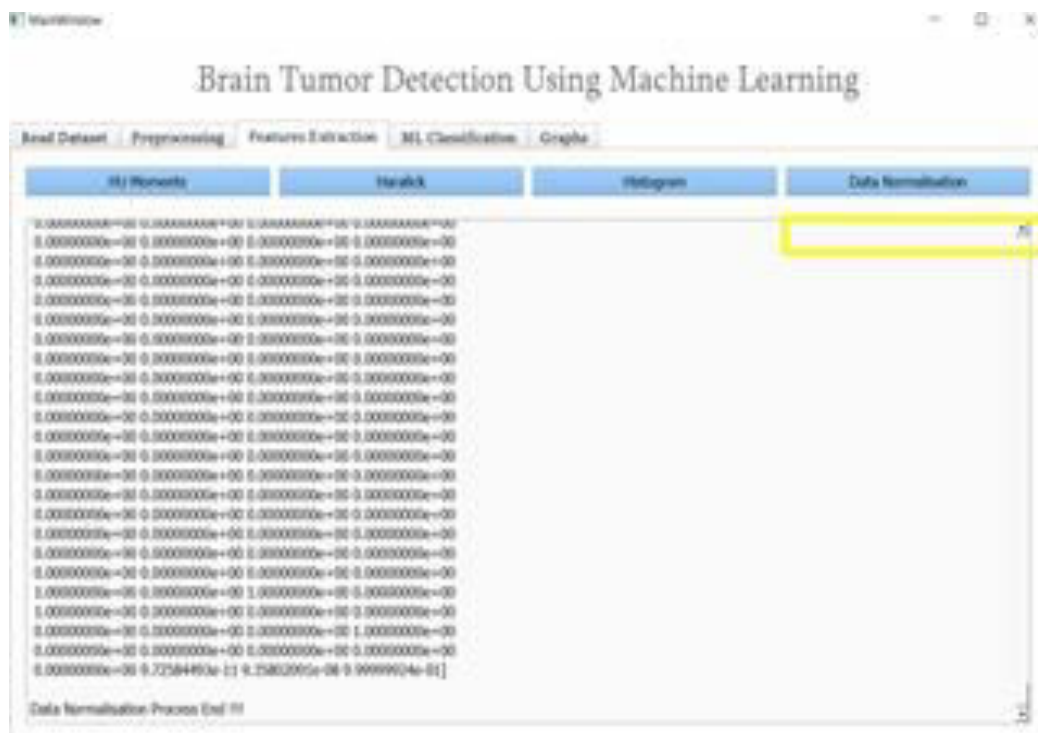
Calculation formula:

$$\text{F - measure} = \frac{2 * \text{Precision} * \text{Recall}}{(\text{Precision} + \text{Recall})}$$



Data Normalization

Normalization refers to rescaling real-valued numeric attributes into a 00 to 11 range. Data normalization is used in machine learning to make model training less sensitive to the scale of features. This allows our model to converge to better weights and, in turn, leads to a more accurate model.



RANDOM FOREST

Random Forest is a popular machine learning algorithm that belongs to the supervised learning technique. It can be used for both Classification and Regression problems in ML. Fitting the Random forest algorithm to the Training set, Predicting the test result, Test accuracy of the result (Creation of Confusion matrix)

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DATASET LINK

Brain MRI dataset <https://www.kaggle.com/abhranta/brain-tumor-detection-mri>

A Machine Learning Model for Prediction of Human Insurance Premium Prediction

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ABSTRACT

This paper is concentrated on the study of colorful approaches used to develop the “Human Insurance Premium Prediction”. The target of the understanding is to denuclearize the administration of protection exercises of an insurance agency Enhancement in Real-Time using Machine Literacy and Neural Network to perform Mortal insurances ultra-expensive Keywords Machine Learning, Retrogression, Deep neural network, insurance.

INTRODUCTION

How numerous accidents you would like to understand that you simply need Health Cover? It takes only one visit to a sanitarium to form us realize how vulnerable we are, every passing second. For the rich also as poor, manly also as womanish, and youthful also as old, being diagnosed with an illness and having the necessity to be rehabilitated can be a tough fire. Heart problems, diabetes, stroke, order failure, cancer – the list of life. conditions just feel to prompt longer and more common recently. Thankfully there are further things hospitals and specialist croakers – but all that comes at a price. The super-rich can go at similar costs, but what about a mean bourgeoisie person. For an illness that needs hospitalization/ surgery, costs can fluently run into five number bills. An insurance policy can cover similar charges to an outsized extent.

Read why insurance is more important recently compared to the old day,s health may be a right, which has also been accepted within the constitution. Its availability and affordability have got to be ensured. While the well-to-do member of the population both in pastoral & civic areas have adequacy and affordability towards medical care, at the same time can not be said about the people who belong to poor members of the society. It's proved that relatively 75 of the population utilizes private sector for medical aid unfortunately medical aid getting premium day by day and it's come nearly out of reach of the poor people. health insurance is insurance against the threat of incurring medical charges among individual.

RELATED WORK

Check-In this section, exploration sweats from the disquisition of information and machine literacy ways are bandied. Several papers have bandied the issue of claim prediction. Jessica Pesantez-Narvaez suggested, "Predicting motor insurance claims using telematics data" in 2019. This exploration compared the performance of logistic retrogression and XG Boost ways to read the presence of accident claims by a small number and the results showed that because of its interpretability and strong pungency, logistic retrogression is an effective model than XG Boost. The system proposed by Ranjodh Singh and others in 2019, this system takes filmland of the damaged auto as inputs and produces applicable details, similar to costs of form to decide on the quantum of insurance claim and locales of damage. Therefore the prognosticated auto insurance claim wasn't taken into account in the present analysis but was riveted on calculating form costs. Oskar Sucki 2019, The purpose of this exploration is to study the vaticination of churn. Random timbers were considered to be the stylish model (74 percent rigor). is aimlessly lost, and so the missing. data medium by which the applicable approach to data g values. Following an analysis of the distributions, the decision has been taken to substitute the missing variables with fresh attributes suggesting that this data doesn't live. This is permitted only if the data is aimlessly lost, and so the missing. data medium by which the applicable approach to data processing is decided has first to be established. In 2018, Muhammad Arief Fauzan et al. In this paper, the fineness of XG Boost is applied to prognosticate statements. Compare the affair with the performance of XG Boost, a collection of ways, AdaBoost, Random Forest, Neural Network. XG Boost offers a better Gini-structured delicacy. Using intimately accessible Porto Seguro to Kaggle datasets. The dataset includes huge amounts of NaN values but this paper manages missing values by medium and median relief. Still, these simple, unconscionable styles have also proven to be poisoned. They, thus, concentrate on exploring the styles of ML that are largely applicable for the problems of several missing values, similar to XG boost, G. Kowshalya, M. Nandhini. in 2018. Three classifiers have been developed in this study to prognosticate and estimate fraudulent claims and a chance of decorations for the colorful guests grounded upon their particular and fiscal data. For the bracket, the algorithms Random Forest, J48, and Naïve Bayes are chosen. The findings show that Random Forest exceeds the remaining ways depending. on the synthetic dataset. This paper thus doesn't cover insurance claim vaticinations,

but rather focuses on false claims. The above former workshop didn't consider both prognosticated the cost or claim inflexibility, they only make a bracket for the issues of claims (whether or not a claim was filed for that policyholder) in this study we concentrate on advanced statistical styles and machine literacy.

METHODOLOGY

Merge Sort Algorithm

Merge sort is one of the most efficient sorting algorithms. It works on the principle of Divide and conquers. Merge sort repeatedly breaks down a list into several sublists until each sublist consists of a single element and merges those sublists in a manner that results in a sorted list.

A Merge Sort Works as Follows: Top-Down Merge Sort Implementation:

The top-down merge sort approach is the methodology that uses a recursion mechanism. It starts at the Top and proceeds downwards, with each recursive turn asking the same question such as "What is required to be done to sort the array?" and having the answer as, "split the array into two, make a recursive call, and merge the results.", until one gets to the bottom of the array-tree.

Example: Let us consider an example to understand the approach better.

Divide the unsorted list into n sublists, each comprising 1 element (a list of 1 element is supposed sorted).

Working of Merge Sort, Top-down Implementation

Repeatedly merge sublists to produce newly sorted sublists until there is only 1 sublist remaining. This will be the sorted list.

Merging of two Lists Done as Follows:

The first element of both lists is compared. If sorting in ascending order, the smaller element among two becomes a new element of the sorted list. This procedure is repeated until both the smaller sublists are empty and the newly combined sublist covers all the elements of both the sublists.

Merging Two Lists

Implementation of Merge Sort

Bottom-Up Merge Sort Implementation:

The Bottom-Up merge sort approach uses iterative methodology. It starts with the "single-element" array, combines two adjacent elements, and also sorts the two at the same time. The combined-sorted arrays are again combined and sorted with each other until one single unit of the sorted array is achieved.

Example: Let us understand the concept with the following example.

Iteration (1)

Bottom-up Iteration 1

Merge pairs of arrays of size 1

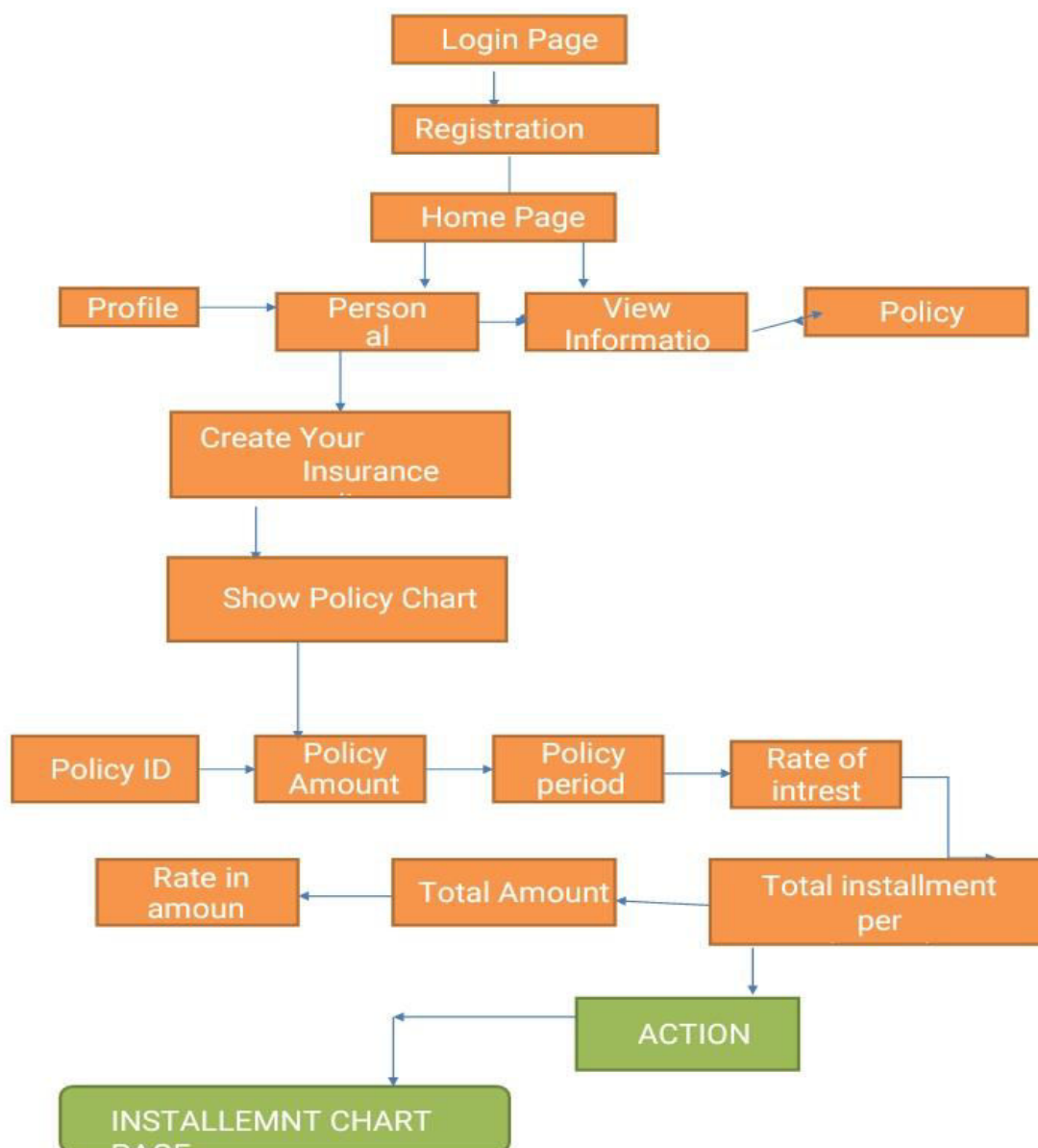
Proposed System

An insurance system with tracking managers is a web application software that provides insurance services to users in different fields which including life insurance, medical insurance, motor insurance, and house insurance.

SCOPE

- This application software has three types of users
- Policy-holder: the existing policyholder can log in and view their profile, pay the premium and view the existing policy details. They are provided with a particular username and password to access their profile
- Company official: can log in to the system and can generate new policies grant loans to the existing policy holder and add new schemes but it should be approved legally by the administrator and then these policies will be updated. The company officials will be given a particular username and password from which they can log in and generate policies and view policyholder details.
- Administrator: the administration approves the policies generated by a company official and only the administration has the right to update the information. there will be nan admin, who will have an admin id and password and he/she can give approval of new policies generated and can alter information.

5. FLOW CHART/DATA FLOW DIAGRAM



RESULT

As discussed in the related work, a number of algorithms have been implemented using Convolution neural networks, deep neural networks, etc. In this paper, we have discussed face recognition using PCA & SVM.

Table 1:- Comparative Accuracy

Serial no.	Algorithms	Accuracy
(1)	Algorithm using Deep Neural Network	97.5%
(2)	Algorithm using Convolution Neural Network	53.3%
(3)	Holistic and Feature-based algorithms	82%
(4)	PCA Union SVM (Proposed system)	94%

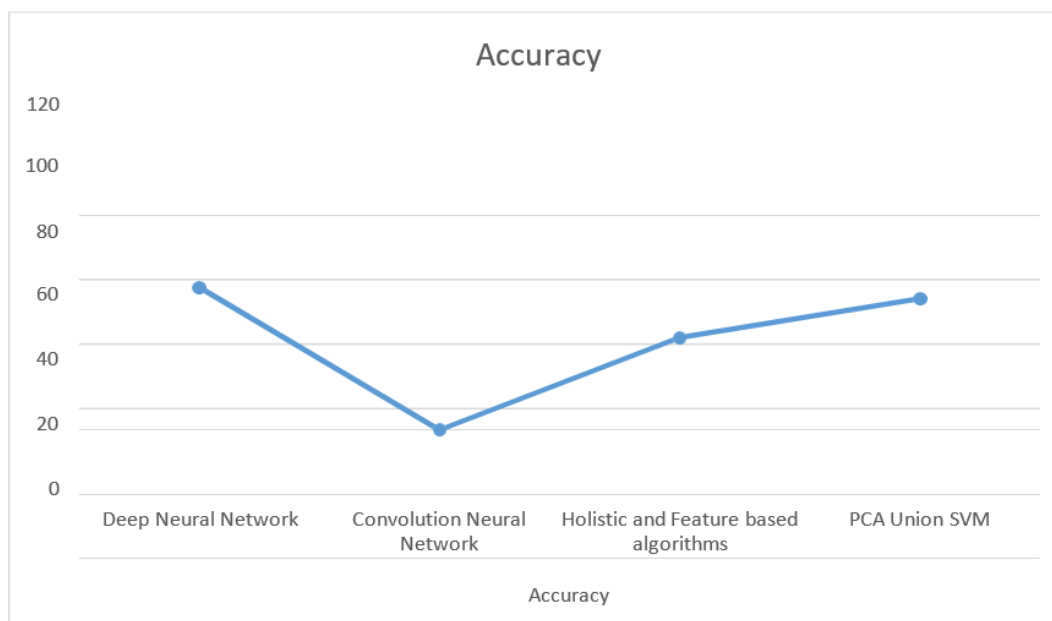


Figure 2:- The comparative analysis of accuracy in the graphical representation.

CONCLUSION

Health insurance is a type of insurance that covers medical charges. A person who has taken a health insurance policy gets health insurance cover by paying a particular decoration quantum. There are a lot of factors that determine the decoration of health insurance the quantum of the decoration for a health insurance policy depends from person to person, as numerous factors affect the quantum of the decoration for a health insurance policy. Let's say age, a youthful person is veritably less likely to have major health problems compared to an aged person. Therefore, treating an aged person will be page 1 of 2 . Precious compared to a youthful bone. That's why an aged person is needed to pay for a high decoration compared to a youthful person. Just like age, numerous other factors affect. The decoration of a health insurance policy. Hope you now have understood what health insurance is and how the decoration for a health insurance policy is determined.

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Fitness Center: An Automated System for Gym Notification with Client Attendance and Guidance System

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ABSTRACT

Many gym owners have paper receipts for the fees. It is very difficult for both the members and the trainer to keep all the paper receipts safe. Also it is difficult to manage all the client at a time and mark their attendance and provide exercises and diet plans. Some of the issues that arise when using an online application are: There are many people who are not able to use it due to various reasons. So, we are making an Android app which will help them. This project will allow the gym owner to manage all the receipts and also notify the users about their fees, mark their attendance by own, provide them proper diet plans as per the BMI and body type. Also this application will help them by providing exercise guidance clips. Gyms and workout studios often only focus on getting people to purchase year-long memberships. The holistic approach to the customer's well-being, be it physical exercise or mental state and motivation – is missing from most of the gyms.

Keywords: fitness centers, customer service, customer engagements

I. INTRODUCTION

There are plenty of fitness apps out there with strong focus on providing performance feedback, dietary suggestions or workout plans. Fitness apps can be helpful for individuals who don't mind the extra engagement with the app itself. Unfortunately, not many have the headspace to stay engaged with apps and consistently put in personal fitness information, diets or design workout plans. Analytics can help optimize personal performance but some users feel daunted by checking on analytics too often. Daily fluctuations in body weight and not improving performance of previous weeks can have a negative effect on the motivation.

More so we face a personalization issue with almost every fitness application. Dietary computations and performance indicators can be overstated or understated for users. The rising awareness around the importance of fitness is clearly not converting into an increased number of people joining your gym or fitness studio. Because usually after joining the gym, people often struggle to continue with their workout regime. Apart from lack of motivation, there is also, evidently, a clear lack of engagement between your workout center and the people you wish to convert into customers.

Creating a personalized experience which goals, educates them and motivates them is the need of the hour. And talking about a cost-effective solution for personalization, what's better than a gym chatbot! A chatbot in the fitness sector can help your customers stay loyal to their workout plan and in turn, to your brand.

A gym chatbot interacts with your users using a chat interface and solves their FAQs about your business and the services that you provide. Chatbots are integrated with websites or messaging apps to help businesses automate their regular tasks. These days, it is common to encounter a chatbot while booking flights, ordering food, approaching a company's customer support.

LITERATURE REVIEW

Physical fitness is not just one of the most becoming popular, with many fitness studios and gyms opting for them not only to enhance important keys to a healthy body, it is the foundation of dynamic and creative work "(Jahn F Kenedy). The first human anatomy keeps them at night free to move and our body needs movement. Sports talk has always been used for survival purposes, such as hunting, breeding, and providing shelter As civilization began in sports of the body than modern humans (Cooper, 2013)

As time went on and physical activity Even in the industrial sector, after the first steam engine was developed and as traditional methods were already established with the people growing their own food, the average person still burns more calories than today. The era of technology has begun, exercise has declined for the average person but as more spectators have said there has been an increase in recreational Sports. Sports has reached a new level of participation.

Exercise had become a real option for all classes and levels of slow exercise began to rise again by the end of the 20th century. During this time, many people had the option of becoming an athlete. This began with the package agreement, having a personal trainer, eating a healthy diet and creating a socially acceptable health image.

By the end of the 20th century exercise became an image and a way of life. People from all walks of life wanted to be part of the world. It was a game for everyone. In the world of fitness, people were getting harder and harder. We were introducing a new fashion and a new body for bodybuilding. In the fashion industry, models were starting to grow faster and stronger.

I. PROPOSED METHODOLOGY

The main goal of the study is to build a computer program for the gym. Project time and resources were very limited. The efficient use of working time requires that each session and all work be planned. To Plan Effectively, Effective Project Management Skills are required, Practical Skills and track the best method to be used.

The Method I Use Includes the Following: Understanding the Subject:

1. It is important that the application field as presented in the project
2. It may be a completely new field. So as soon as the task was assigned to me, I carefully reviewed the project requirements to see project requirements.

System Partition

- Identify Various Modules in the System.
- Add them to the appropriate list.
- Identify Their Priorities for Development.
- Different Modules in Computer system.

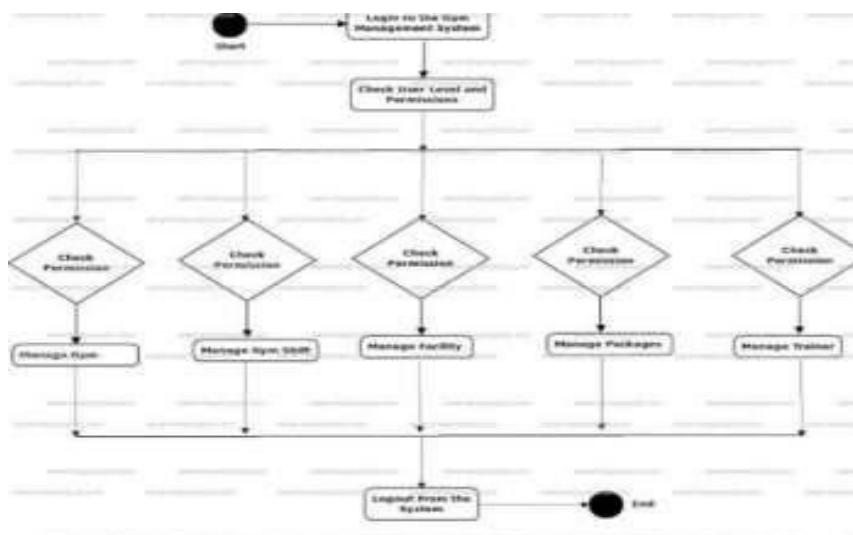


Figure 1: Working Model

Fig.2 working

II. IMPLEMENTATION RESULTS

Based on this research thesis entitled “ Fitness Centre(gym notifier with client attendance and guidance system)”, which developed and solved the problems identified in the current system as follows: The development of the Fitness Center gym system hopefully it can solve the problem of membership registration by performing an online procedure .efficient and inexpensive.

The development of Fitness Centre (gym notifier with client attendance and guidance system) can also solve the problem of membership renewal by renewing membership days as soon as possible.

The search process was performed very successfully. Development of Fitness Centre (gym notifier with client attendance and guidance system) hopefully can solve the problem of non-member transaction with payment records made faster and reduce errors.

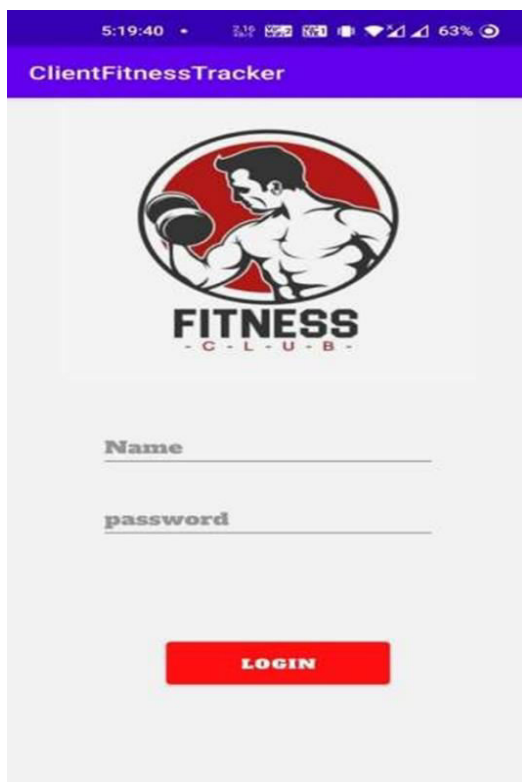


Figure 2: Login Screen



Figure 3: Before GPS Initialization



Figure 4: After GPS Initialization

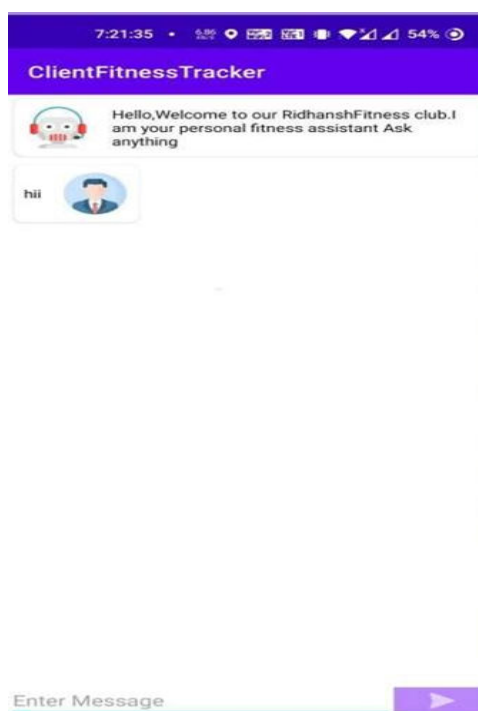


Fig. 5: Chatbot

III. LIMITATIONS AND FUTUREWORK

One limitation of our study is the relatively small sample size. A larger scale study should be performed to further confirm the findings. In addition, the population of the study is university students, who may not be as concerned about their physical wellness as other populations (i.e., middle aged and elderly). However, when this enthusiasm wore out after 5 weeks, we observed significant difference in physical activity behavior between the two groups, suggesting the potential of using the CalFit app (and its underlying features such as the automated generation of personalized step goals using reinforcement learning) to deliver physical activity interventions.

Adults managing their chronic diseases). Another limitation is that the study lasted for only 10-weeks, so the long-term impact of the CalFit app is unclear.

In the future, we would like to extend our observations further by studying hypotheses in three directions. Firstly, how do different goal setting sources (ie, self-set, trainer-set, and machine set) impact the intervention outcome? Secondly, how do different dynamic goal setting algorithms impact their intervention outcome? In particular, it would be beneficial to unveil if the success of this study is due to the BAA algorithm or due to the fact that step goals are not steady. We would like to compare the BAA algorithm to simpler analytical algorithms, such as, for example, setting the goal to be the 60th percentile of the steps in the past week. Thirdly, we would like to isolate the impact of the various design features (ie.. push notification, history tab, etc.) to provide recommendations on the most effective features to future fitness app designers.

The development of the Fitness Centre (gym notifier with client attendance and guidance system) can resolve the problem of presence by recording the date and exact time of every gym user automatically from the time of entry to the time of exit.

The development of the Fitness Centre (gym notifier with client attendance and guidance system) hopefully can solve the problem of financial reporting by providing evidence of a product produced each time in the form of a report from a transaction analysis that can simplify the process of evaluating a member's income. Registration, renewal of membership and non-member transactions.

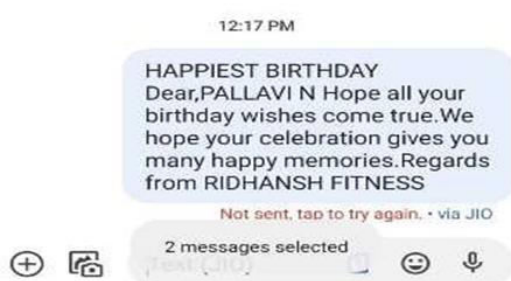


Figure 7: Wishing birthday

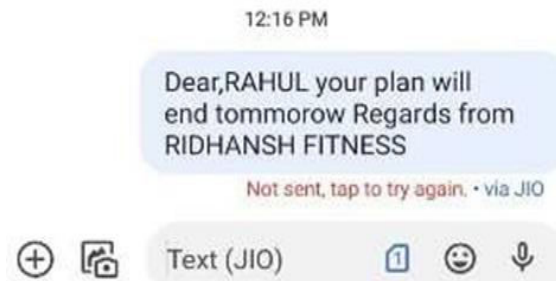


Figure 8: Plan Reminder

CONCLUSION

The objective of this project was to build a program for maintaining the details of all the members, employees and inventory. The system developed is able to meet all the basic requirements. The management of the records (both members and employees) will also be benefited by the proposed system, as it will automate the whole procedure, which will reduce the workload. The security of the system is also one of the prime concerns. There is always a room for improvement in any software, however efficient the system may be. The important thing is that the system should be flexible enough for future modifications. The system has been factored into different modules to make the system adapt to the further changes. Every effort has been made to cover all user requirements and make it user friendly. Goal achieved: The System is able to provide the interface to the owner so that he can replicate his desired data. User friendliness though the most part of the system is supposed to act in the background, efforts have been made to make the foreground interaction with user (owner) as smooth as possible.

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Face Recognition System with Sound Alerts & Health Monitoring Sensor

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ABSTRACT

This paper examines various techniques to developing a "facial Recognition System & Health Monitoring Sensor." The face is one of the most easy ways to determine a person's individual identity. Face recognition is a type of personal identification system that uses a person's personal traits to determine their identity. Face detection, which occurs relatively quickly in humans unless when the item is positioned at a short distance away, and introduction, which recognizes a face as a person, are the two phases of the human face recognition procedure.

The stage is then repeated and developed as a model for facial image recognition, which is a widely researched and developed biometrics technology. Their face recognition is used to identify illegal immigrants, terrorists, and those who are quarantined for covid or have a serious viral infection.

The Pulse Sensor is an Arduino-compatible heart-rate sensor. Students, artists, athletes, makers, and game and mobile developers can utilise it to incorporate live heart-rate data into their creations with ease. An integrated optical amplification circuit and noise-reducing circuit sensor are the heart of the system. The Pulse Sensor can be clipped to your earlobe or fingertip. After that, plug it into your Arduino and you're ready to read heart rate.

Keywords: Image Processing, OpenCV, Haar Cascading, Arduino.

I. INTRODUCTION

1.1 FACE RECOGNITION

In this project, a camera is used to recognise a person's face, and if the person is a terrorist, the system will immediately pass the information to the police or anti-terrorism force; if the person is quarantined or ill with a major disease, the same thing will happen, except the person's information will be passed to the medical team or hospital. The laptop is the most important component of this system, and it runs on Python.

In these type of system face detection has been a very major part of the whole working model. Face recognition has been all about reading faces and getting all important facial feature information from an image and representing them in meaning full information from which is then classified or processed in categories. The most common way of performing face recognition is to use information based on geometric feature of a human face.

1.2 PULSE SENSOR

The Pulse Sensor is a well-designed low-power plug-and-play heart-rate sensor for the Arduino. It can be used by students, artists, athletes, manufacturers, and game & mobile developers who want to incorporate live heart-rate data into their projects.

And the best part is that this sensor plugs right into Arduino and easily clips onto a fingertip or earlobe. It is also super small (button-shaped) with holes, so it can be sewn into fabric.

II. LITERATURE SURVEY

Robust Real-Time Face Detection was proposed by Paul Viola and Michael J. Jones [3]. They were only useful when using systems based on their recommendations. The constraints included a variety of variables that could not be controlled at all times, such as changes in the person's location, changes in the brightness of the environment, and so on. As a result, inefficient systems are labelled when they are not used within the constraints.

The author proposed Real-Time Human Face Detection and Tracking [4] in this study. Based on a modification of the Viola-Jones algorithm, their research [1] proposes a method for real-time profile detection and recognition. The new method's results showed that computers could recognize and track up to 50 human faces utilising the updated strategy. Data processing and time consumption are considerably decreased in such systems.

Based on this concept, the author proposed creating a face recognition system that would employ a web camera to capture images at various intervals. An accuracy of 68 percent has been discovered in such systems. They

discovered that the Viola-Jones algorithm is the most accurate and fastest of all the methods. Other face detection algorithms, such as Local Binary Pattern and SMQT Features, are simpler to calculate and can handle lighting concerns, but their overall performance is inferior to the Viola-Jones algorithm.

The author of this paper developed the Viola-Jones face detection method for use in a face recognition system. They discovered that the Viola-Jones approach is not only fast and robust, but also has a high detection rate and performs well in a variety of lighting circumstances, outperforming methods such as face geometry-based methods, feature invariant methods, and machine learning-based methods.

Face-recognition software. The purpose of this study was to increase people's detection while they were isolated in order to stop the spread of covid-19. These confined individuals may leave their designated areas and disperse among a crowd of healthy people, breaking covid rules. Human eyes cannot monitor each and every individual among millions of people due to the numerous drawbacks of manual monitoring and keeping an eye on them. Quarantined individuals can be recognised more quickly and efficiently utilising a facial recognition technology. This piece of writing portrayed the idea of saving time while also strengthening the security system based on facial recognition. It was an excellent strategy. This notion can capture images. in a location where a camera or CCTV camera is used to capture people's faces, Then it used facial recognition software to find the face. Eyes, nose, mouth, hairs, and different poses of the human body the image of a face Face-lifting techniques came in a variety of styles.

2.1 PULSE SENSOR USING ARDINO UNO:

2.1.1 Pulse Sensor

A pulse wave is the change in the volume of a blood artery caused by the heart pumping blood, and a pulse sensor is a detector that detects this volume change.

The ECG, photoelectric pulse wave, blood pressure measurement, and phonocardiography are the four basic methods for measuring heart rate.

The photoelectric technique is used in pulse sensors.

Depending on the measuring method, pulse sensors using the photoelectric pulse wave technology are classed as transmission or reflection.

Pulse waves are measured using transmission types that produce red or infrared light from the body surface and detect changes in blood flow during heart beats as a change in the amount of light passed through the body.

This approach can only be used on locations where light may easily pass through, such as the fingertip or the earlobe.

A reflection-type pulse sensor is currently being developed by ROHM (Optical Sensor for Heart Rate Monitor).

Below is an explanation of the reflection-type pulse sensor (Optical Sensor for Heart Rate Monitor).

2.1.2 Reflection-Type Pulse Sensor (Optical Sensor for Heart Rate Monitor)

Reflection-type pulse sensors (Optical Sensors for Heart Rate Monitor) emit infrared, red, or green light (550nm) toward the body and use a photodiode or phototransistor to measure the amount of light reflected. Because oxygenated haemoglobin in the blood of the arteries has the property of absorbing incident light, we may measure the pulse wave signal by sensing the blood flow rate (change in blood vessel volume) that changes over time as a result of cardiac contractions.

Furthermore, unlike transmission-type pulse sensors, the range of appropriate areas is not limited because reflected light is detected.

Operating Mechanism of a Reflection-Type Pulse Sensor (Optical Sensor for Heart Rate Monitor)

Arduino is an open source computer hardware and software firm, project, and user community that designs and manufactures single-board Microcontrollers and microcontroller kits for creating digital devices and interactive things that can sense and control physical items.

III. PROPOSED SYSTEM

- The actions to take are as follows:
- The person's face dataset is saved in the system. To receive the photographs captured by dataset creator.py, he or she must stand in front of the camera, facing the camera.

- The FaceTrainer.py application then uses this dataset to train the photos for the classifier.
- The FaceTrainer.py file now generates a yml file that the Haar Cascade file requires for the Face recognition process.
- A camera collects photographs of a confined person whose face dataset is saved in the system when they enter a restricted location.
- Images are captured by the camera.
- Image enhancing will begin after the image has been captured.
- After picture improvement, the image is saved to a dataset directory where students with similar faces can be checked.
- The face detection process will begin if a comparable face is found in a directory.
- After that, the system will use the Haar Cascade method to recognise the students' faces.
- Alerts can be sent after the face is recognised.
- If no error is identified, the system will revert to the previous stage.

IV. METHODOLOGY

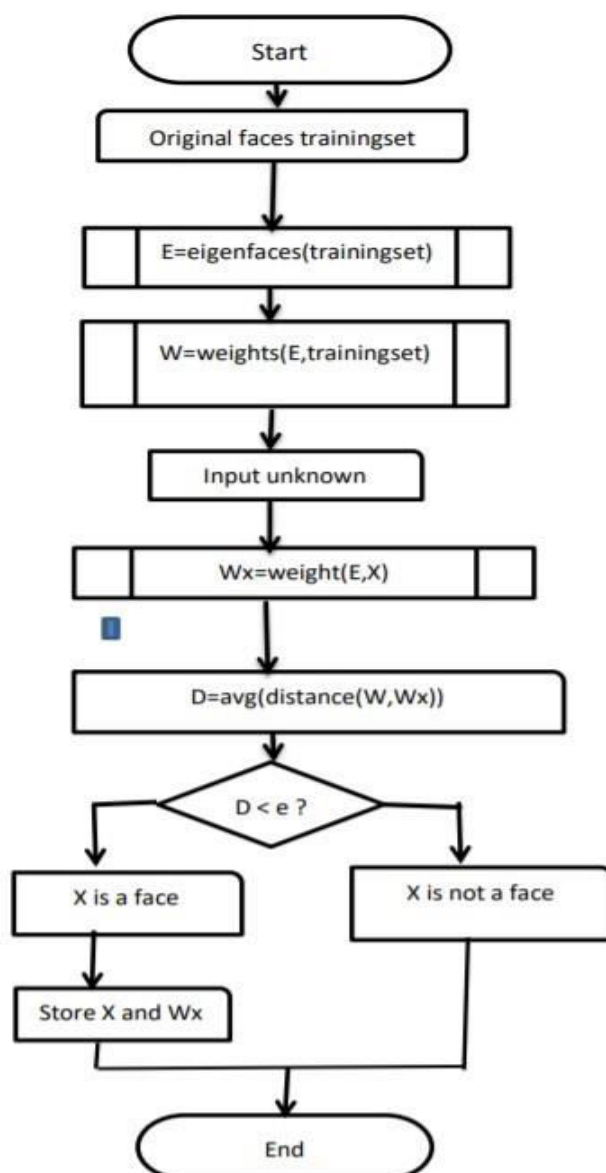


Fig.2: Flow Chart of Methodology

The Following Blocks are Commonly Found in Face Recognition Systems:

1. Image input
2. Facial recognition
3. Image manipulation
4. Recognition of faces
5. Validation/Verification

A. Image Input

Any physical image capturing device, which is an input to the system, captures a physical or behavioural sample of picture.

B. Face Recognition

It basically involves finding a face in a picture.

C. Image Processing

The photographs are trimmed to remove any lingering facial images before being converted to black and white and then grayscale.

D. Facial Recognition

It refers to taking a face's features (eyes, nose, etc.) and creating a template from them. E. Verification System identifies a certain person and makes a decision.

F. Validation

To identify a given face, this system compares a given individual face to faces in the database.

4.1 HAAR CASCADE CLASSIFICATION

In their 2001 paper "Rapid Object Detection with a Boosted Cascade of Simple Features," Paul Viola and Michael Jones proposed an excellent strategy for recognising objects using Haar cascade classifiers. Object identification is a machine learning-based method that involves using a large number of positive and negative photos to train a cascade function.

A classifier that is trained using many examples of a specific object (specifically, a cascade of boosted classifiers working with haar-like characteristics) is a good example (e.g., a face or an automobile). You'll be able to detect anything you want if you train your classifier with those kinds of variables. For example, if you want to detect faces, you'll need to train your classifier on a huge number of photographs featuring faces. So, Positive photographs are those that have the object you're looking for in them. Similarly, we'll use negative photos to train the classifier, which are images that don't include the object you're looking for. If we wish to recognise a face, for example, we should utilise an image without a face. A classifier can be applied to a region of interest in an input picture after training, and the classifier will return a 1 if the region is likely to show the object and a 0 otherwise.

Here, we'll be working on facial recognition. To train the classifier, the cascade function requires a large number of positive images at start. It comprises faces and negative images (images without faces). Then we need to extract features from it. For this, we use Haar. The characteristics shown in the diagram are used. They look a lot like our convolutional kernel. A single value is assigned to each characteristic. Subtract the total of pixels beneath the white rectangle from the sum of pixels beneath the black rectangle.

The machines can determine the main image of pupils using the Haar Cascade classifier. To train our classifiers, we must first collect all of the positive and negative photos of pupils. We only employ haar characteristics with the lowest error rate since these are the features that most reliably classify face and non-facial photos.

4.2 HARDWARE

4.2.1 Arduino Uno

Arduino is an open source computer hardware and software firm, project, and user community that designs and manufactures single-board Microcontrollers and microcontroller kits for creating digital devices and interactive things that can sense and control physical items.

A variety of microprocessors and controls are used in Arduino board designs. The boards have a set of digital analogue input/output (I/O) pins that can be used to connect to expansion boards, breadboards (shields), and other circuits. Serial communications ports, including Universal Serial Bus (USB) on some variants, are

available on the board and are used to load programmes from personal computers. Microcontrollers are often programmed using a dialect of C and C++ programming features. The Arduino project includes an integrated development environment (IDE) based on the Processing language project, in addition to traditional compiler tool chains.

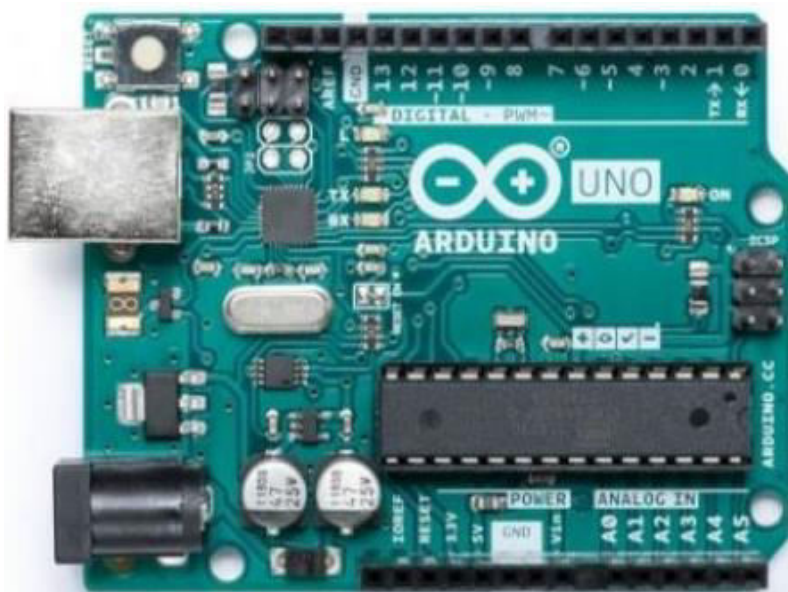


Fig.1: Arduino Uno

4.2.2 Heart Rate Sensor

Arduino boards employ a wide range of microprocessors and controls. The boards contain digital analogue input/output (I/O) pins for connecting to expansion boards, breadboards (shields), and other circuits. Serial communications connections are available on the board, including USB on some models, and are used to load programmes from personal computers. C and C++ programming features are frequently used to programme microcontrollers. In addition to typical compiler tool chains, the Arduino project features an integrated development environment (IDE) based on the Processing language project.

The variations in the volume of blood in an organ are measured by the changes in the intensity of light passing through that organ, according to this concept. In most heartbeat sensors, the light source is an IR LED, and the detector is a Photo Detector such as a Photo Diode, an LDR (Light Dependent Resistor), or a Photo Transistor.



2 (a)

Fig 4.2(a): Heart Beat Sensor



2(b)

4.2(b): Front side and Backside of Heart Beat Sensor

V. RESULTS

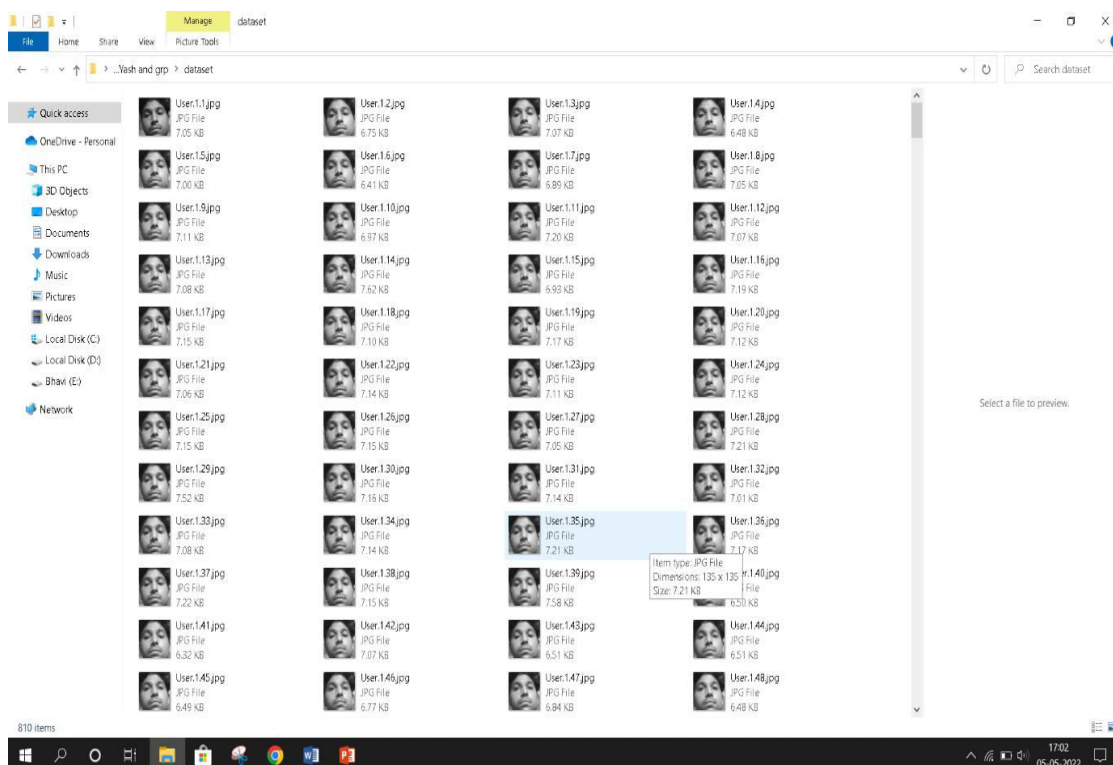


Fig: 5.1 Dataset Creator

Let's get our project started with the first step. Starting with the last phase (Face Detection), we'll simply establish a dataset in which we'll keep a group of photographs in grey with the fraction that was used for face detection for each id.

Make a subdirectory called "dataset" where we will keep our facial samples:

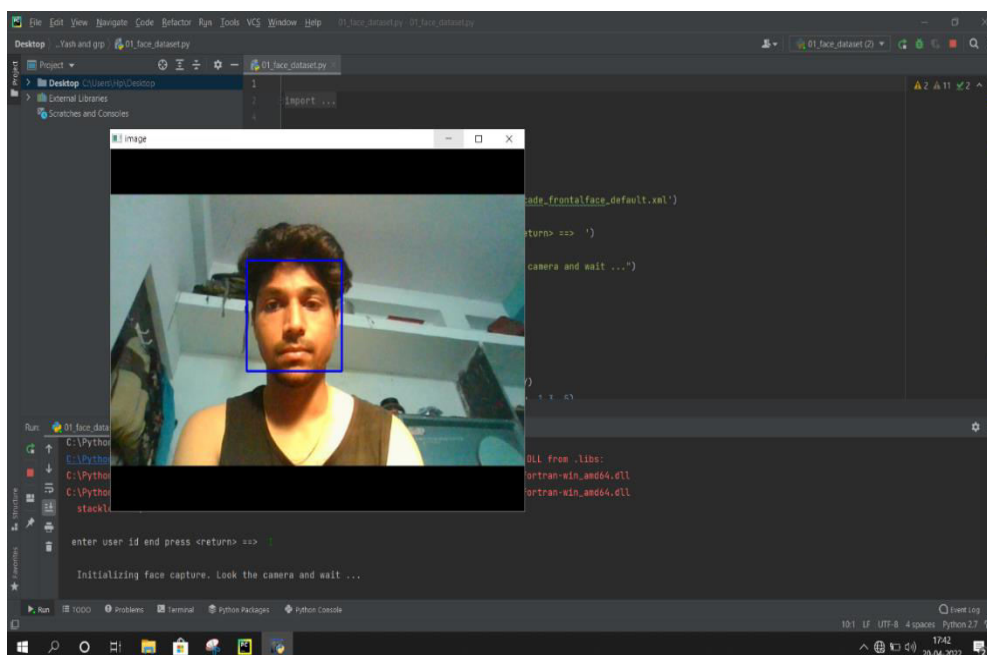


Fig: 5.2 Capturing Face for Dataset

Figure 5.2 depicts the situation. An "input command" was introduced to collect a user id, which should be an integer number (1, 2, 3, etc). Face capture is also started.

We should also save each of the collected frames as a file in the "dataset" directory. For a user with a face id of 1, the fourth sample file in the dataset/ directory will be named User 1.1.

Each time you wish to aggregate a new user, you must run the script (or to change the photos for one that already exists).

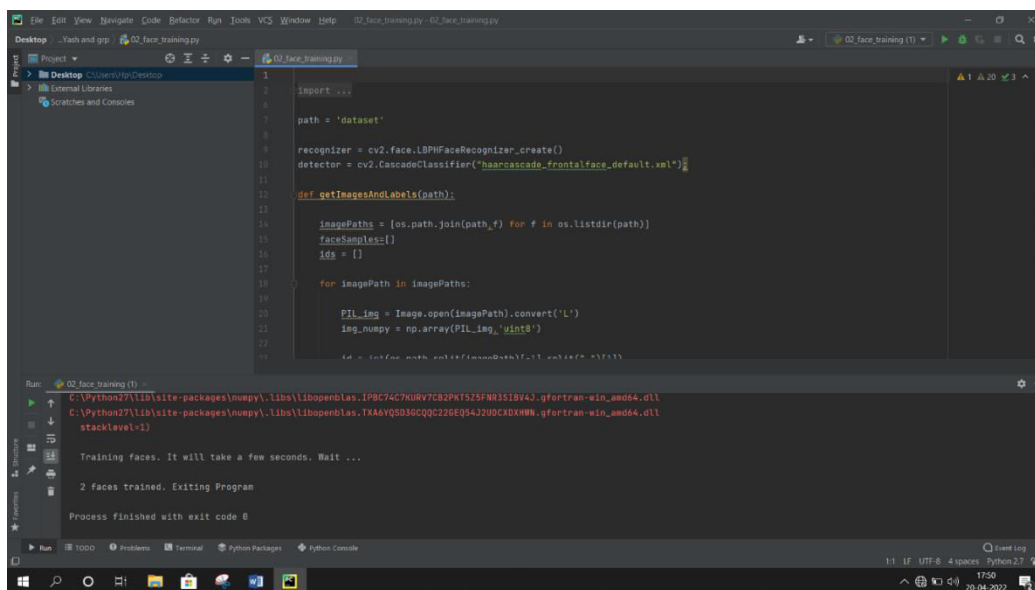


Fig: 5.3 Training Faces

Step 2: Write the Trainer.yml file

Figure 5.3 depicts the situation. We must "train" the OpenCV Recognizer with all user data from our dataset. A special OpenCV function is used to accomplish this. A.yml file will be created and saved in the "trainer/" directory as a result.

The LBPH (LOCAL BINARY PATTERNS HISTOGRAMS) Face Recognizer from the OpenCV package will be used as a recognizer. The function "getImagesAndLabels (path)" will return two arrays: "Ids" and "faces" for all photographs in the directory "dataset/." We'll "train our recognizer" using those arrays as input.

As a result, a file called "trainer.yml" will be saved in the trainer directory that we generated previously.

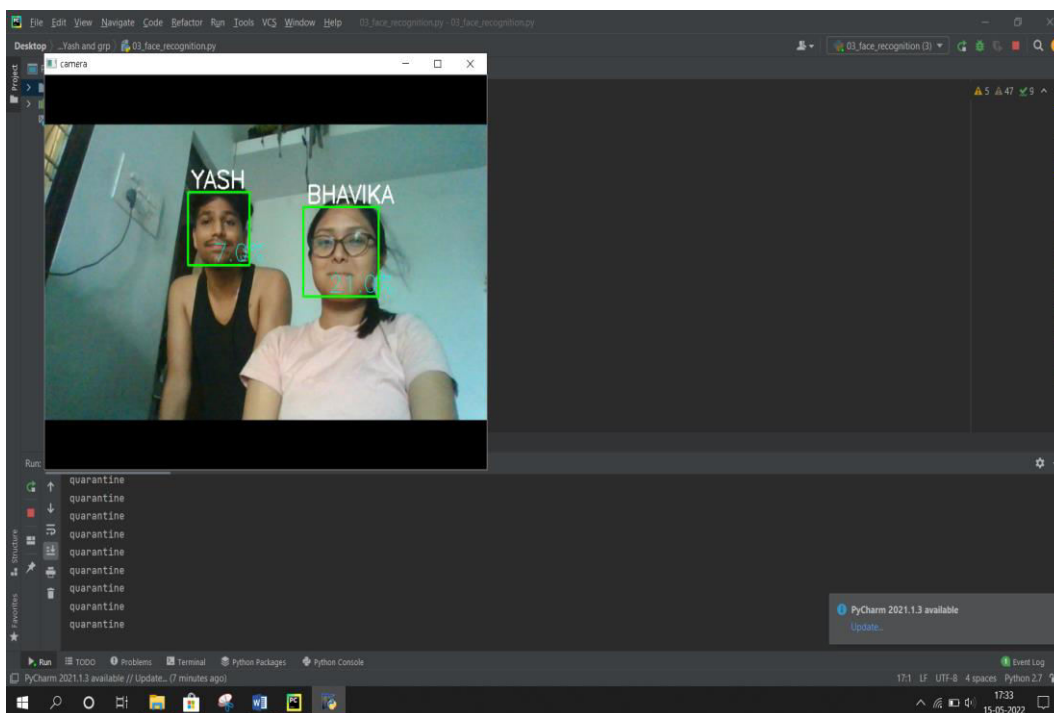


Fig 5.4 Face Recognition of user 1 and user 2

We've caught a new face on our camera in Figures 5.4 and if this person's face has been collected and trained before, our recognizer will make a "prediction" and provide its id and an index, indicating how confident the recognizer is with this match.

Following that, we must detect a face, as we did previously with the haarCascade classifier. We can call the most crucial function `id`, `confidence = recognizer`, once we have a detected face. `predict` (gray portion of the face).

The `recognizer.predict ()` function takes a captured section of the face to be studied as a parameter and returns its likely owner, including its `id` and how confident the recognizer is in this match.

Note that if a perfect match is considered, the confidence index will yield "zero."

Finally, if the recognizer correctly predicted a face, we overlaid a text with the probable `id` and the percentage chance that the match is correct ("probability" = 100 — confidence index). If this is not the case, the face is labelled "unknown."

Step 3: Recognizer

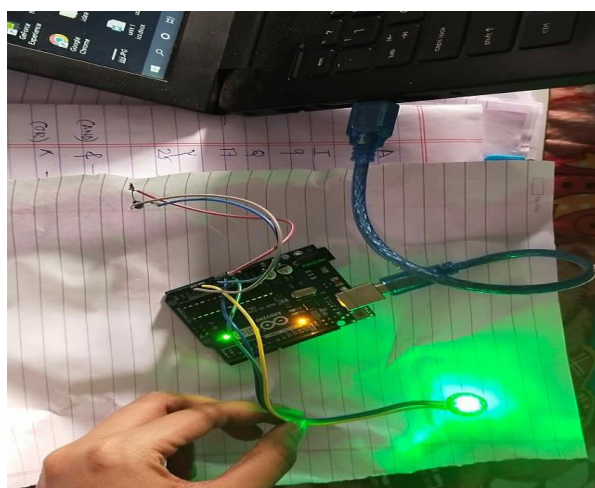


Fig:5.5 Working Health Monitoring Sensor using Arduino Uno

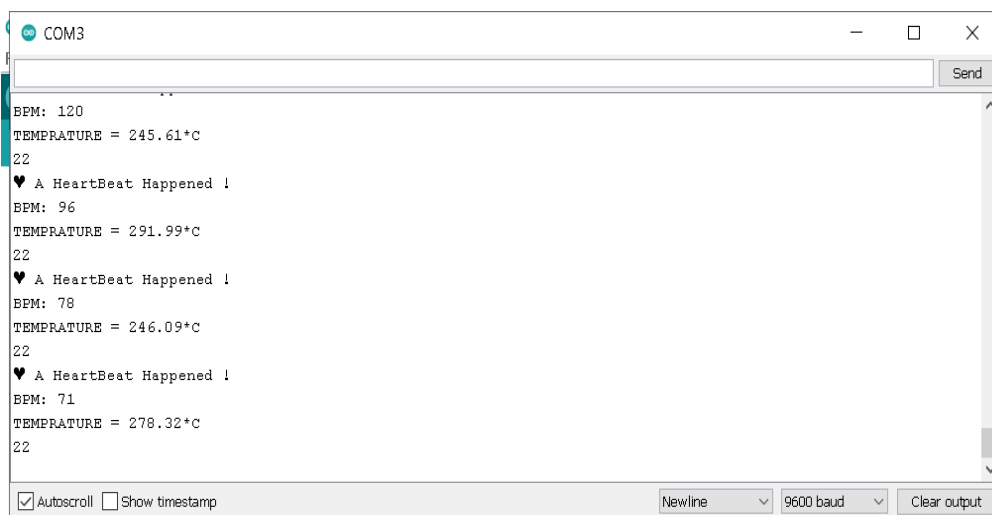


Fig: 5.6 Heartbeat and BPM Displayed on Arduino Uno ide

As shown in Fig 5.5, 5.6, In case of health monitoring sensor with the help of arduino uno and pulse sensor we have detected heartbeat and Bpm .

In the Arduino Uno Ide display console ,a message is printed "A HeartBeat Happened" and detected user BPM is displayed.

VI. CONCLUSION

Face recognition algorithm will be implemented in this dissertation. Not only are we strengthening security, but we are also capturing the person's background, which will aid the security system. As a result, the System functions effectively.

And, with a small, inexpensive portable heart beat sensor, a person can monitor their BPM and temperature at any time and in any location.

VII. FUTURE SCOPE

This section discusses potential next directions for the work provided. We will use the collected image in BGR scale in future experiments so that allowed people can see it. Iris Recognition, a type of biometric authentication that uses pattern-recognition techniques based on high-resolution photographs of an individual's iris, will be developed in the future on this system. In the future, this device could be employed in a bank's locker room.

In case of heartbeat sensor it can be easily implemented in hospitals, even an individual can also use this particular sensor.

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A Toddler Gaming Application Using Android

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ABSTRACT

Due to COVID situation people were forced to do work from home, all the offices and schools were closed for a certain period of time, this affected children a lot, kids these days are attracted towards mobile phones, laptops, tabs and other digital devices a lot. To counter this situation there are many apps that help kids in their studies that help them to boost up their knowledge and confidence. The authors of this paper took the liberty to introduce a gaming application where toddlers learn new things with a slight touch of entertainment, what counter measures are taken so that toddlers utilise their time efficiently by playing a small game which could not only increase their general knowledge, utilise their time but also will hold their attraction towards the application which can provide them knowledge with slight touch of entertainment "Toddler Tunes". Different methods have been used to essentially solve this problem, which is quite significant.

The effectiveness of these methods can be mostly explained by the impact on how to watch mobile phones, laptops, tablets, v.v, particularly contrary to popular belief.

One of the best ways is to create a children's teaching program, leading to the pretty appropriate growth of children with a little touch of entertainment which is quite significant.

Keywords: Android, kind of Play app, Kids Games, Cell Phones, which is quite significant, small games

I. INTRODUCTION

People were compelled to work from home due to the COVID issue, and all workplaces and schools were closed for a period of time. This had a significant impact on children, who are increasingly drawn to mobile phones, laptops, tablets, and other digital gadgets. The authors of this paper took the liberty of introducing a gaming application where toddlers discover new skills with a slight touch of entertainment, as well as preventive measures are taken so that toddlers use their time efficiently by playing a small game that will not only increase their general knowledge, but will also hold their attraction towards the application that will provide them knowledge with a slight touch of entertainment "Toddler Tunes."

The author designed a toddler game app. Infants are children aged 3 to 10 years old. The author wishes to teach the game to the toddlers. B. Educational games such as Mental UP, Coco, Curious World, Toca Blocks, and others. Flutter, Google's open-source UI software development kit, is used by the author.

Flutter is used to develop applications for various platforms for Android, iOS, Linux, Mac, Windows, Google Fuchsia, and the Web from a single code base.

Toddlers are like sponges, learning from all activities, games, books, and finding sponges in the form of trapped situations. This helps toddlers get a little fun and educated. As you know, today's toddlers spend a lot of time on mobile phones, TVs, tablets, etc. instead of spending time in the field and playing various games. This app helps them develop a creative mind by getting more information.

II. LITERATURE SURVEY

Over time, the history of addiction to sports, mobile phones, and television is increasing and is an important research topic of many institutions; many people have come up with many different ideas and models to achieve effective results. Addiction reduction.

In the past, mobile games were pushed aside to distract from "more appropriate" activities, such as homework/homework or outdoor reading or play classes.

Today, researchers, teachers, and learning resource designers are beginning to use this new strong method to support children's learning. This assessment aims to introduce a timely reflection on the role of mobile games in improving children's learning support. [1] It highlights important aspects of research in this area, including the growing interest in playful learning, hands-on learning, and cooperative learning, which games seem to give you. At the same time, the update takes on a limited tone by accepting some of the obstacles and challenges of using mobile games in our current education system. [2]

It goes on to suggest ways in which educational designers, researchers, and policymakers can use the growing research topic in the field to create superior learning resources and environments. top "fun" rich sugar content.

interactions that mobile games seem to offer more children today.[3] Thanks to mobile games, children perceive the need to move, absorb important information, develop and feel, feel what is good and bad, what makes them happy or unhappy, using use all of their senses.[6]

Through these games, the needs of the community are met, such as communication with peers and elders; they become their role models, the players know their team or their enemies well, negotiate, organize themselves, negotiate and agree on a game, learn to elect a leader (captain) democratically, have fun together, join a team, make things work. their senses, developing their imaginations and abstract ideas.[5]

Preservation of traditional culture through sports is essential to the preservation of our country, the new generation, and our generation, which is based on traditional values that have been tried, well preserved, and preserved in education. [15]Traditional games are treasures and cherish. Through them, children gain knowledge, and cultural experience and develop customs and skills, so they are powerful educational tools.[4]

Exercise not only fills your leisure time, but also develops your knowledge, actions, and skills. Today, there are several studies discussing the impact of sports on learning. All of these learning outcomes can also be categorized into specific skills. [7]

Thus, one of the interests of this study is to investigate a subset of learning results to provide a clear and revised view of sports in learning. By understanding the power, of the teacher, researcher, and game developer, the player can use the game carefully in learning. [8]

Since the introduction of personal computers in the classroom in the early 1980s, the development of educational software for preschool and elementary school students has long confused many in the education and research community. Falloon (2013) states that researchers trying to measure the performance and educational value of mobile applications face the same challenges as researchers trying to measure the educational impact of computer software. The use of design principles that apply to the elements of personal computer educational software is often used to build educational applications. [9]

Most educators and parents cannot clearly explain what constitutes a developmental app. There are great apps of all kinds that are fun to play but have no real educational purpose. Note that, as [10,14] states, for parents and educators, just because an app falls into the "education" category of a digital store does not mean it is educational. Is important. In addition, you don't have the time, money, or resources to test every released app. Studies show that there are few barriers to the use and learning of "education", except that there are no real educational goals. Application.

The terms in the "KIDS Category" application do not include educational terms. Instead, it focuses on compliance with specific legal applications and requirements, such as B. Protecting children's online privacy, lack of ethical advertising, and prohibition of the use of financial services. [11]

This suggests that competition among developers will intensify as more applications are downloaded to the digital store. [11] Although the quality of the app exceeds the star rating published on retailers' websites and digital stores.[12]

The iTunes App Store, on the other hand, has many "tutorial" apps, often referred to as "digital worksheets" or "skills and piercings" apps. Many applications on the market have interactive, repeatable gaming formats with "closed" content. H. The user was unable to modify or extend the content [13]

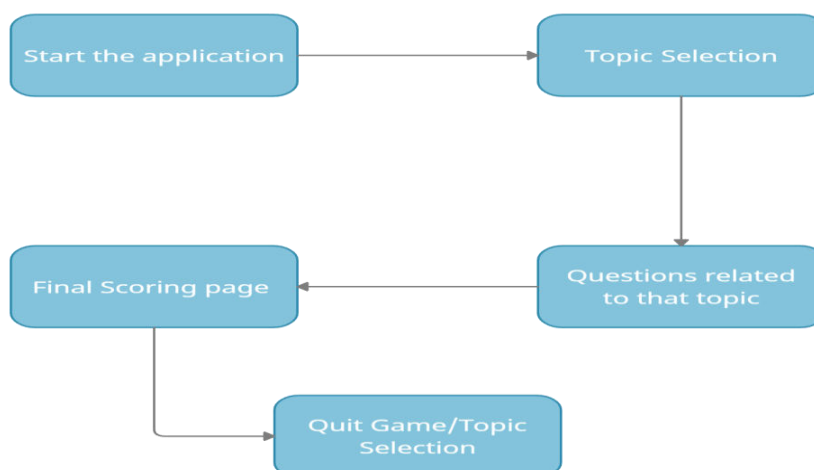
III. IMPLEMENTATION

With the proper implementation of the app. Kids will get entertainment in the form of an educational touch.

The initial step is to make a proper script for the app which is to be presented in the app. A script could perhaps be consisting of different questions related to the topics that are in the app. The difficulty level of these questions might be easy as the game is for toddlers.

The following phase is to create a basic UI framework as the project's architecture or blueprint, giving an idea of what it could look like.

(a) Block Diagram of the Project



Block Diagram of Toddler Tunes

The initial step is to write a decent app script that is provided in the app. The script is made up of many questions that are linked to the app's topics. These questions are simple because the game is designed for children.

(b) Screenshots of Modules



UI Design of Start Page

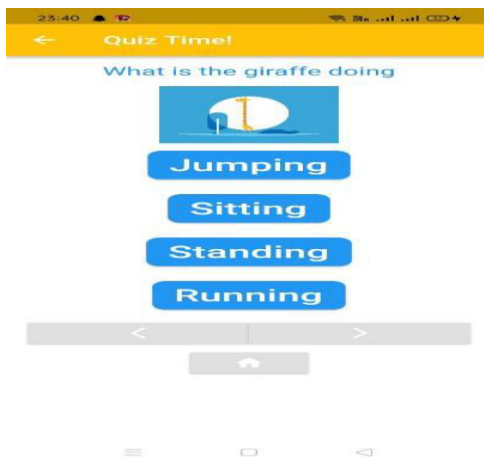
In UI designing first, the Author has developed the start page of the app, then the author has designed the topic selection page where there are various topics that the kids have to select the topic of their own choice. There are certain topics like animals, toys, musical instruments, and vehicles.

These topics are having questions related to that particular topic which the kid chooses to be played with.

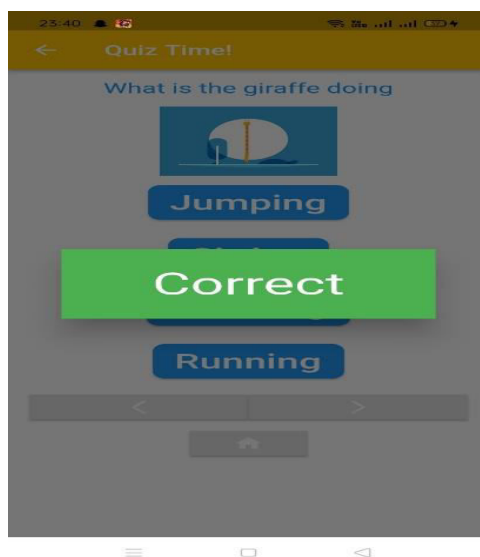


Topic Selection Page

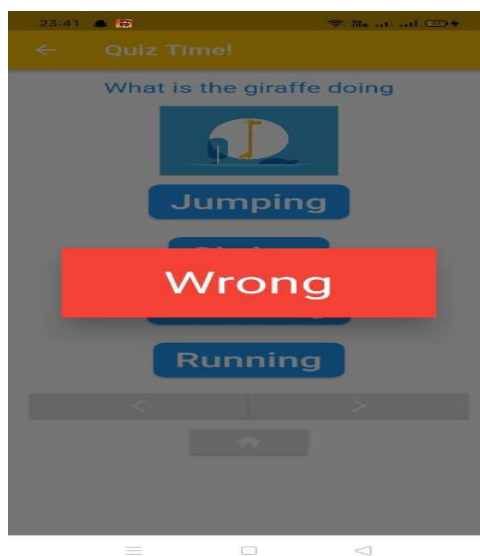
Suppose the kid selects the topic “Animals” then all the questions related to Animals will appear on the screen with some option buttons where the kid has to select the correct option from the given options, after selecting the option, there is a screen showing that the kid's answer is right or wrong. After completion of the topic, there is a scoring page where the final score is displayed on the screen with some interactive animations on the screen.



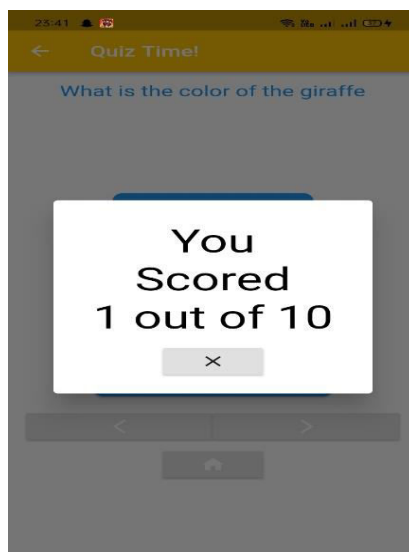
Question Page



Page Showing That the Answer is Correct



Page Showing That the Answer is Wrong

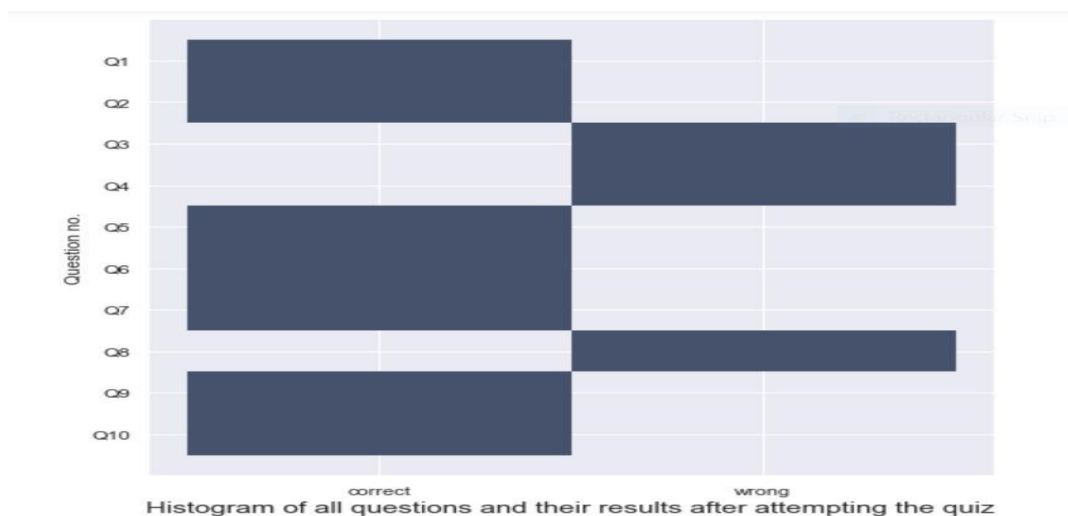


Final Screen/ Final Scoring Page

After some questions, the kid will be awarded his/her points that were scored in the game. After that he/she will be having 2 options i.e. choose the first option and move to the topic selection page or finish the game by pressing the quit button.

(c) Graphs of Screenshots of modules

Taking into consideration different application / software for the questions attempted and their results is analysed with for eg: ABCmouse, Epic!, GoNoodle etc .



IV. PROPOSED METHODOLOGY

A. Ideas

Young children are often seen doing different and orderly behaviors in front of other people that help their generation communicate. Such behavioral patterns are important in shaping their social world. They formally form the basis of their social development in the form of social experiences. These patterns provide a window into the growing understanding of children about themselves and the process of communication and communication. The Author's idea is to help children develop these patterns in a better and more informative way.

Today, the amount of harmful content available on the Internet is immeasurable. This is a bad dream for parents. Even worse is the time children spend in front of the screen. Especially foods that are harmful or useless.

So to make the most of this screen time, the author's idea was to create a program that could not only distract children from harmful content but also educate them.

B. How it is implemented

The app UI will be upgraded by the Framer of the tool. 'Home Page' will be used afterward. Then a title page will appear. After that, when choosing any topic, questions, puzzles etc. will be displayed on the screen. After resolving these, a scoreboard will appear showing the last user points and user number of positive and negative responses.

After completing the game, the two 'Stop Game' and 'Play Again' options will be displayed on the screen. All of this will be done and processed using flutter.

The app UI will be upgraded by the Framer of the tool. 'Home Page' will be used afterward. Then a title page will appear. After that, when choosing any topic, questions, puzzles etc. will be displayed on the screen. After resolving these, a scoreboard will appear showing the last user points i.e. number of positive and negative responses.

C. Architectural Diagram

The Author's main focus is to create an app that will not only involve a select category of users in the 3-10 year age group using screen time for a better reason but also help them in their daily community life. These factors include teaching them the basics of elementary education and in which case an application like this should include the four pillars outlined in the diagram.

These pillars include key topics that help a child in his or her life. The author of the app follows these principles as the Author has created the tutorial app.



V. CONCLUSION

The author says that this game contributes to the healthy childhood and intellectual development of children through mobile games. Through games, children are encouraged to express their interest in the environment, continue their research, learn more about the environment and relationships, and develop their values and attitudes towards the world and life. The results suggest that mobile games can promote intellectual development in preschool children. Additional research in other developmental areas such as psychomotor and communication skills is important for young children.

VI. RESULT ANALYSIS

This paper aims to develop a game-based learning program for young children. The principles of this application are in the areas of communication and communication, national knowledge, and personal and social training, and are divided into knowledgeable and competent learning areas. The author also wanted to develop an app with an animated screen that will attract children on their own. The author also wanted to add features such as poetry to help improve communication, including popular children's poems.

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Securing Data Using Image Steganography and Encryption Techniques 22

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ABSTRACT

Nowadays, the community has important roles for transferring records precisely and quick from source to a destination. In this project we are develop new algorithm to Securing Data using Image Steganography and Encryption technique Steganography is defined as the study of invisible communication. Steganography is a form of security technique through obscurity, the science and art of hiding the existence of a message between sender and intended recipient. Steganography has been used to hide secret messages in various types of files, including digital images, audio and video. The three most important parameters for audio steganography are imperceptibility, payload, and robustness. Different applications have different requirements of the steganography technique used. This paper intendsto give an overview of image steganography, its uses and tec

Keywords: Steganography, Stego, LSB, ISB, MSB

INTRODUCTION

Security of information becomes one of the most important factors of information technology and communication because of the huge rise of the World Wide Web and the copyrights laws. Cryptography was originated as a technique for securing the confidentiality information. Unfortunately, it is sometimes not enough to keep the contents of a message secret, it may be necessary to keep the existence of the message secret and the concept responsible for this is called steganography. Steganography is the practice of hiding secret message within any media. Most data hiding systems take advantage of human perceptual weaknesses. Steganography is often confused with If both the techniques: cryptography and steganography is used then the communication becomes double secured. The main difference between Steganography and cryptography is that, cryptography concentrates on keeping the contents of a message secret while steganography concentrates on keeping the existence of a message secret. Steganography and cryptography are both needed to protect messages from third party but each one with its own. Thus, when there is a need protect the presence of message; the steganography is the solution. Probably most common cover media are multimedia objects which are images, audio, and video. Here, in this paper, we focus on images as cover media. Two other technologies that are closely related to steganography are watermarking and fingerprinting These technologies are mainly concerned with the protection of intellectual property. Examples of common application of steganography are in the field of copyright protection. According to the information hidden in the bit stream allows an early resynchronization of the video. The only price to pay is a small degradation of the undamaged video quality, with a very limited increase in computational complexity.

II. LITERATURE SURVEY

[1] Hiding information in images, L.M. Marvel, C.T. Retter, C.G. Boncelet (2011) We have presented a novel steganographic methodology that uses error control coding, image processing, and spread spectrum techniques. This process provides a method for concealing a digital signal within a cover image without increasing the size of the image. Additionally, cover image escrow is not needed due the image restoration resulting in a more practical system. A level of security is provided by the necessity that both sender and receiver possess the same public or private keys. the embedded signal power is insignificant compared to that of the cover image. This insignificance provides low probability of detection, and thereby leaves an observer unaware that the hidden data exists. [2] New Data Hiding Algorithm in MATLAB Using Encrypted Secret Message, Agniswar Dutta, Abhirup Kumar Sen, Sankar Das, Shalabh Agarwal (2011) In the present work we try to embed some secret message inside any cover file in encrypted form so that no one will be able to extract actual secret message. The program developed in MATLAB. We embed LSB and LSB+3 bits of the cover file in every alternate byte position. The encryption of the secret message file here we have taken 5 times but one can go up to any limit. But if we increase the encryption number then the process becomes slow but the encryption will be very strong. In principle it will be difficult for anyone to decrypt the encrypted message without knowing the exact encryption method. Our method is essentially stream cipher method and it may take huge amount of time if the files size is large and the encryption number is also large. This present method may most suitable for water marking. The steganography method may be further secured if we compress the secret message first and then encrypt it and then finally embed inside the cover file. [3] Implementation and Comparison of different Data Hiding Techniques in Image Steganographyy Asha Asok Poornima Mohan (2016) We presented the first wait-free

hash table implementation as a proof-of-concept for the design and implementation of our LC/DC library of nonblocking algorithms and data structures. Our hash table implementation provides the progress guarantee of wait- freedom with a performance improvement over the best available locking solution and all tested lock free solutions. We discussed the relevance of this work and its applicability in the real-world. As modern and future architectures feature many cores, large number of threads, and greater sharing of information, it is essential to explore such novel paradigms for concurrent software design. The envisioned library implementation and the associated programming interface and optimization support will provide an immense productivity and performance boost for developers of existing and future scientific and systems applications, which are predominantly in C/C++. [4] Steganography Based Data Hiding for Security Applications

G. Ramya; P.P. Janarthanan; D. Mohanapriya (2018) In future, the proposed technique can be enhanced so that the processing time can be reduced. Further, in the present system, only the audio signals are used. In future, the audio signals from any instrument can be taken directly. Instead of LSB algorithm, the other algorithms like threshold- based steganography may be used for audio and image steganography at different stages. The proposed technique can be used in real time applications such as Ecommerce, banking, and military and so on for security purposes. [5] Hiding The Text into An Image By Max-Plus Algebra Kiswara Agung Santoso; Ahmad Kamsyakawuni; Abduh Riski (2018) Image Steganography is a technique that finds

Applications in many fields, for purposes like data hiding or storing confidential data. Many varieties of Image steganography techniques are available nowadays So, the selection a particular technique depends on its efficiency. By comparing the above-mentioned methods, it can be seen that LSB Substitution with some amount of encryption is the better one among them. PVD substitution on the other hand provides better imperceptibility but is more complex than LSB substitution based on similarity of bit pairs.

III. PROPOSED SYSTEM

The original aims of the paper are to introduce a technique for hiding a text file, which techniques hide a secret text file inside an image file, and the modified image must be similar to the original image, in other words the changes that happen on the modified image mustn't be visible, or the human eye would be unable to notice it. The project application loads 24-bit BMP, GIF, and JPG image format, embed data into them using Sunflower system and saves the images. Encryption can be used before embedding the data to provide robustness. Finally, the application can also extract data that was previously embedded. The application runs in a user friend Windows environment where the user can view the image, before and after the embedding. fig (3.1) The Proposed Structure of Sunflower System structure of the proposed system is shown below.

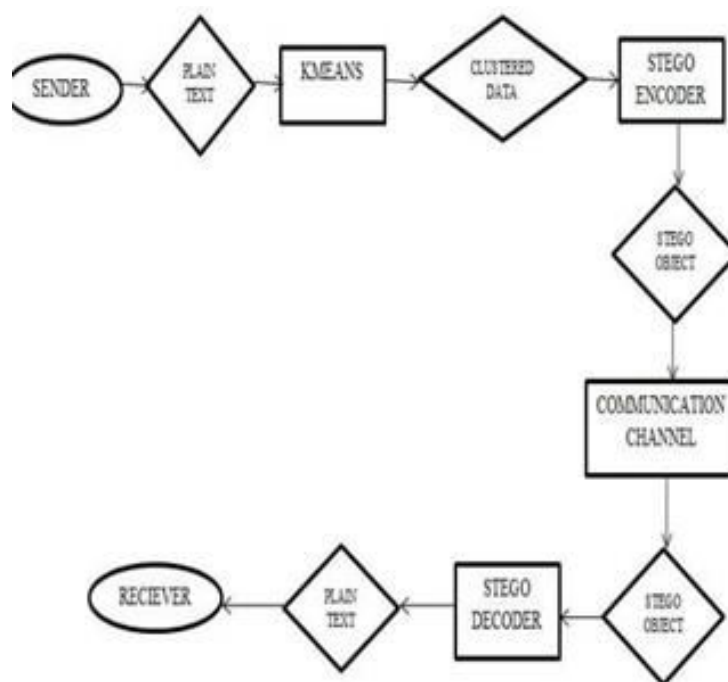


Fig. Proposed Design

Fig (3.1): Proposed System Design

IV. MODULES

- Cluster
- Cluster classification
- Hide- Here the secret message is hidden in image by segmenting the image. Here, Kmeans clustering technique is used to get accurate results

CLUSTERING

To create clusters from the input data, we have used k-means clustering algorithm. Kmeans is one of the simplest unsupervised learning algorithms that solve the well-known clustering problem. The algorithm initially has an empty set of clusters and updates it as it proceeds. For each record it computes the Euclidean distance between it and each of the centroids of the clusters. The instance is placed in the cluster from which it has the shortest distance. Assume we have a fixed metric M , and constant cluster width W . Let $d_i(C, d)$ be the distance with metric M , Cluster centroid C and instance d where centroid of cluster is the instance from feature vector.

CLUSTER CLASSIFICATION

If cluster width is chosen properly then after clustering each cluster contains instances of the same type. The major task is to determine which clusters are normal and intrusive in case of intrusion detection. Here we assume that the maximum number of records are normal from the training set. Then it is highly possible that the cluster with the maximum number of instances contains normal records and other clusters contain attack records. We have used 75% as the threshold percentage value for labelling the normal cluster. The other clusters are labelled as anomalous.

HIDE:

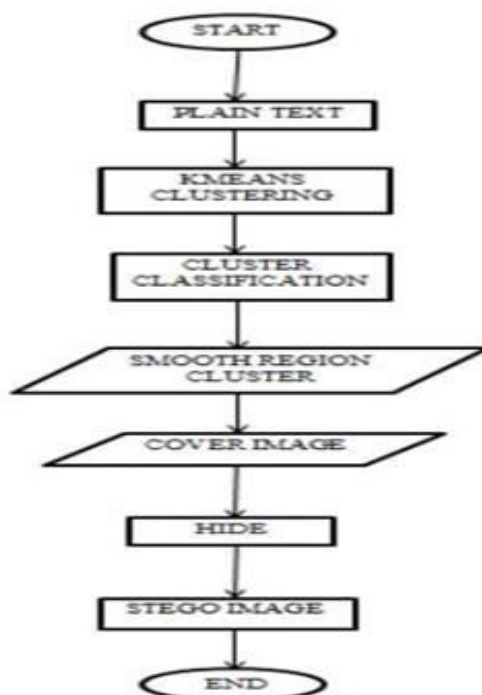


Fig. Encoding Phase

Fig (4.1): Encoding Phase

V. IMPLEMENTATION

Steganography is classified among the foremost methods employed in data security to conceal and safeguard confidential messages in the data transmitted. Security, especially data security, is an important requisite in today's world hence Steganography has great significance. The paper deals with understanding and implementation of steganography on different images using two different techniques: Least Significant Bit method (secret image is hidden using the bits at least significant level of the cover image) and Discrete Wavelet Transform method (secret image is hidden by modification of the wavelet coefficients of cover image). The image to be transmitted secretly is both encoded and decoded using these methods and a detailed analysis of the

resultant images is performed using various image parameters. These experimentally obtained and compared efficiency parameters, thus, demonstrate the efficiency of the methodology proposed in the paper. Fig. (4.1)

VI. METHODOLOGY

Steganography is a process that involves hiding a message in an appropriate carrier for example an image or an audio file. The carrier can then be sent to a receiver without anyone else knowing that it contains a hidden message. This is a process, which can be used for example by civil rights organizations in repressive states to communicate their message to the outside world without their own government being aware of it. Less virtuously it can be used by terrorists to communicate with one another without anyone else's knowledge. In both cases the objective is not to make it difficult to read the message as cryptography does, it is to hide the existence of the message in the first place possibly to protect the courier. The initial aim of this study was to investigate steganography and how it is implemented. Based on this work a number of common methods of steganography could then be implemented and evaluated. The strengths and weaknesses of the chosen methods can then be analysed. To provide a common frame of reference all of the steganography methods implemented and analysed used GIF images. Seven steganography methods were implemented. The methods were chosen for their different strengths in terms of resistance to different types of steganalysis or their ability to maximise the size of the message they could store. All of the methods used were based on the manipulation of the least significant bits of pixel values or the rearrangement of color's to create least significant bit or parity patterns, which correspond to the message being hidden

VII. RESULT ANALYSIS

Admin Page

In Admin Page, Admin login on this page and see the details of Users. Admin can see How many users have registered, what are the queries of the user etc. Show in figure (7.1) and (7.2).



Fig (7.1): Admin login page

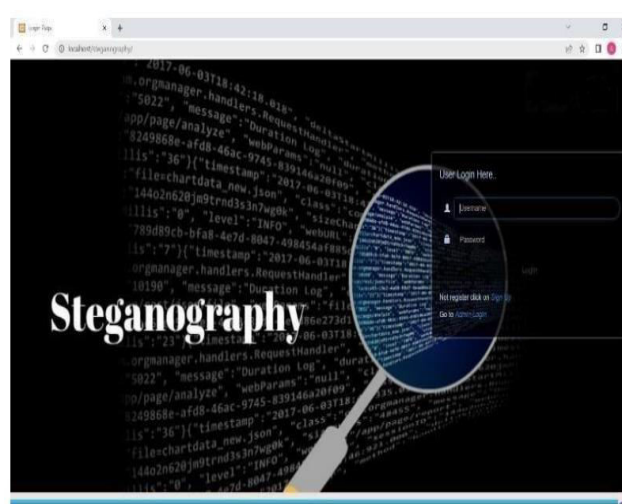


Fig (7.2): User login page



Fig. (7.3): Admin can see what are the queries of the user



Fig. (7.4): User registration page

User Page

In User Page, First User will register on this then User will login and fill Complete information. User can send any data ;fig. (7.5) this data will be hidden behind the image. If the user wants to send a query to the admin, the user can Send the query. Show in figure (7.3) and (7.5).

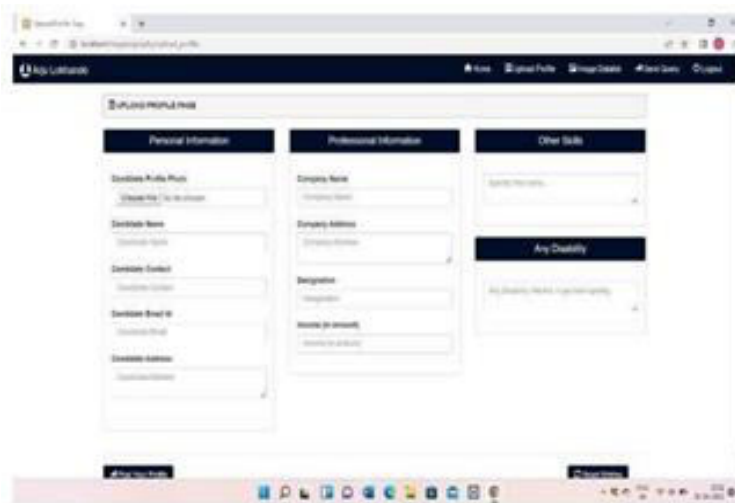


Fig. (7.5): User can send data ana query.

CONCLUSION

In this research work we reviewed many papers on steganography techniques. These papers are good enough and have wide future scope. By reviewing these papers, we observed that most of the steganography work is done in the year 2012 & 2013. In these years, LSB is the most widely used technique for steganography. Some researchers have also used the techniques like water marking, distortion technique, spatial technique, ISB, MSB in their work and provided a strong means of secure information transmission. Most of the papers that are discussed here are taken from IEEE Explore, AICCSA, IJET, IJCSE, IJCA etc. This review paper is enough for them to start their work in this field. The different security and data hiding techniques are used to implement steganography using LSB, ISB, MLSB.

FUTURE SCOPE

Hiding a file, message or even a video within Another file can be an effective way for malware authors to obscure their own payload or to exfiltrate user data. Given the popularity of image sharing on social media sites and the prevalence of image-based advertisement, we expect the recent trend of using steganography in malware to continue. These papers provide a lot of help to the initiator for starting their work in this field. In further research we are going to use more advance schemes like steganography with some hybrid cryptographic algorithm for enhancing the data security

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Car Speed Controller and Accident Avoidance System

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ABSTRACT

Now a day, the alarming rise of road accidents has become one of the major concerns in India. Unawareness and disrespect towards traffic rules, reckless driving, rapid growth of vehicle etc can be identified as factors leading to this issue. The distress of accidents can be done in no time. Many accidents at High-ways are taking place due to the close running of vehicles, all of sudden, if the in front vehicle driver reduces the speed or applied brakes, then it is quite difficult for the following vehicle driver to control his vehicle, resulting in an accident. In this paper, we have been proposed to develop a system automatic speed control of vehicle and accident avoidance.

Keywords: Accident, sensors, GPS, Arduino UNO, Image, OpenCV, Drowsiness Detection.

INTRODUCTION

In the past few years there has been development and many innovations on how to prevent road accidents and to increase driver's safety; one of the major developments was the involvement of technology to help in improvising driver's safety measures during driving. Usage of driver alertness system has been a very progressive idea since many years and even now, but still there are no fully developed system which can give a perfect working model of such systems. All system models that have been or currently are in used have some drawbacks like, speed limit, high costing, night vision, regular calibration, complex setup, etc.

Accident avoidance system is an automobile safety system designed to reduce the severity of an accident. Also known as precrash system, forward collision warning system or collision mitigating system, it uses radar and sometimes laser and camera sensors to detect an imminent crash. Once the detection is done, these systems either provide a warning to the driver when there is an imminent collision or take action autonomously without any driver input (by braking or steering or both). Collision avoidance features are rapidly making their way into the new vehicle fleet.

Manual transmissions require the use of a clutch pedal, which is placed to the left of the brake pedal. The clutch pedal is disengaged by the clutch mechanism placed between the engine and the transmission. The clutch pedal slows down the power from the engine to the transmission when changing gears. The speed is automatically controlled and a predetermined limit is set. This system to communicate between the transmitter and receiver has a range of up to 10-100 metres. This is less expensive than other options.

In these types of system face detection has been a very major part of the whole working model. Face recognition has been all about reading faces and getting all important facial feature information from an image and representing them in meaning full information form which is then classified or processed in categories. The most common way of performing face recognition is to use information based on geometric feature of a human face.

Improvement of public safety and the reduction of accidents is one of the important goals of the intelligent transportation systems (ITS). One of the most important factors in accidents, especially on rural roads, is the driver fatigue and monotony.

Fatigue reduces driver perception and decision-making capability to control the car. Usually after 2-3 hours of continuous driving, driver is fatigued and steering performance is deteriorated. In the early afternoon hours, after eating lunch and at midnight, drivers feel tired much more than other times. In addition, drinking alcohol, drug addiction and using hypnotic medicines can lead to loss of consciousness. Lack of alertness may delay a driver's response to a traffic condition by only a fraction of a second.

Different methods have been proposed for monitoring the alertness of the driver, including position measuring sensors that track eye movement, steering wheel activation sensors to monitor movement of the steering wheel, heart rate sensors that attempt to determine if a driver is falling asleep, etc.

The Objective of this project is to develop a system to keep the vehicle secure and protect it by the occupation of the intruders. The main aim of the project to develop a system automatic speed control of vehicle and accident avoidance using eye blink sensor and ultrasonic sensor. Whenever any obstacle is detected in running vehicle depends on distance automatically control the speed of vehicle. The driver in sleeping /drowse position the eye

blink sensor detects the eye blink is not more than 30 sec eye closed vehicle stop the automatically, it is not manually. Give alarm to driver alert. The ultrasonic sensor system continuously sends signals anmonitors any car or other obstacles are in front of car. The distance up to which ultrasonic sensor can work may be up to 4 meter. When any obstacle or vehicle detected by ultrasonic sensor system it will send signal to the embedded board. After receiving this signal embedded board sends a signal to the motor to reduce the car speed automatically which can control car speed immediately. Vehicle is controlled automatically without any manual operation when the vehicle is at 4 meter distance away from the front vehicle.

LITERATURE REVIEW

This literature review covers eleven items relevant to the topic of braking versus steering. The review of four of these items is based on citations in secondary sources. Malaterre et al. (1987), Ferrandez et al. (1984), and Fleury et al. (1988) were described in Malaterre et al. (1988), and the data from Edwards and Malone (1982) were reported by Forbes (1994). Six field or simulator studies were identified in the literature and are summarized in the type of vehicle used in the experiment, the emergency situation the vehicle encountered, the number of drivers, and the driver reaction to the emergency situation. The purpose of these studies was to determine the types of strategies drivers exhibit when an unexpected obstacle appears in their path. Obstacles included other moving vehicles, a pedestrian, a plastic barrel, a dummy car, and cones [1]

In a paper published in 1973 Rundkvist proposed that Speed was monitored in all situations, but time and distance to collision were not always specifically stated. The experiments took place on either a test track or a simulated road. In one case the track was on a frozen lake (Rundkvist, 1973).

Each of these investigations had a limited number of trials per driver because it was necessary to present drivers with unexpected situations, and that can be done only a limited number of times in an experimental session. summarizes five accident -data analyses in terms of the source of the accident data, number of accidents examined, and the driver reactions. Unless noted otherwise, the accidents are not specific to obstacle avoidance situations, but indicate what drivers do to avoid any type of accident situation [2]

In a paper published in 1976 Hatterick and Bathurst Proposed that The drivers' reactions to the emergency situation were classified by four maneuvers: braking only, steering only, combined braking and steering, and no action. Hatterick and Bathurst (1976) classified driver behavior in terms of 32 types of maneuvers. In order to summarize their data for this review, the 32 maneuvers were divided into five categories: braking, steering, combined braking and steering, no action, and other [3]

In a research report published in 2020, Arokiaraj David proposed their accident avoidance system. Based on their capacity, two-wheeler motorcycles bikes are regarded the most affordable transportation by the middle class and low-income individuals. Even people with higher income levels ride two-wheelers with higher-end amenities. In Asian countries such as India, China, and Japan, there were a large number of vehicle users, accounting for a large portion of the global market. Nowadays, driving a car is regarded as an unavoidable human activity in everyday life.

Due to the population boom and increased demand for vehicles, the two-wheeler vehicle industry has seen a substantial increase in output over the last two decades. According to the most latest information from 2017, there are approximately Two-wheelers were produced in 650 million units over the world (Arokiaraj, 2015). India is the world's greatest user of two-wheelers, particularly in the south. In 2016-17, two-wheeler production hit a new high of 20 million units, with China coming in second with 16.8 million (Sudhakar et al., 2017). In the previous year, the Indian car market sold 17.59 million two-wheelers, followed by China [4]

In a research report published in January 2012, S P Bhumkar proposed their approach for accident avoidance and detection on roads. Technological options for detecting and monitoring driver fatigue levels are still being developed, with several in the early stages of validation testing or adoption. Previous research has looked at the various technologies and approaches for tiredness detection and prediction. This project is about modern technology in cars to make them more intelligent and interactive in order to reduce road accidents, as the name implies. This system becomes more efficient, dependable, and effective by adopting ARM7. In or with cars, there are a very small number of technologies that monitor human behaviour. We discuss a real-time online safety prototype that regulates vehicle speed in this research. The goal of such a model is to develop a system that can identify driver fatigue symptoms and control vehicle speed to avoid accidents. The system's key components are a multitude of real-time sensors such as gas, eye blink, alcohol, fuel, and impact sensors, as well as a software interface that uses GPS and Google Maps APIs for position. [5]

In a study paper published in June 2021, Areej Muhy Abdulwahab recommended their system as a sustainable framework for reducing traffic accidents in Baghdad. Traffic accidents are the city's most serious safety and security issue, with negative consequences for human life, as well as psychological, health, and economic consequences for people, society, and the city. After 2003, the number of cars in Iraqi cities increased, and traffic accidents increased as well, with the number of traffic accidents in Iraqi cities increasing from 8 to 11 thousand per year between 2012 and 2018. The number of accidents in the Governorate of Baghdad 12.1 percent of all occurrences in Iraq occur within Baghdad Governorate, with 66 percent of accidents occurring within Baghdad city (the capital), and 70 percent occurring in Rusafa Governorate. In 2017 and 2018, 30 percent of the population of Karkh was displaced. The most important reasons for accidents in Iraqi cities, according to a poll, are a lack of obedience to traffic laws and a lack of understanding of them, as well as archaic legislation and their non-conformity with technology innovations and communications in the transportation sector. To address the problem of accidents in Baghdad, the research proposes developing an integrated framework that incorporates sustainable transportation in all of its social, institutional, and economic dimensions. framework, traffic accidents, Baghdad City, Social Aspect, and Government Level[5].

Algorithms with Explanation1.Condition Check:

The System Detect to detect the car condition whether it is in a good condition or bad condition if it is in a good condition then the car will display good condition and will run if a car is in a bad condition then it will display bad condition and will stop. Start off the program by including the LCD library. This library should be already downloaded to the Arduino IDE. If for some reason it isn't, go to the Sketch menu >> Include Library >> Library Manager. In the top right text box, type in LiquidCrystal then look for the LiquidCrystal Library. Once you find the library click on it, select the latest version and hit install. Initializing the LCD library is like initializing the servo motor library: LiquidCrystal lcd(12, 11, 5, 4, 3, 2); the numbers are the port numbers that are connected to the pins on the LCD from left to right (LCD is right-side-up). Begin the LCD by using the code below: lcd.begin(16,2); //16,2 for 16x2 LCD screen

2. OBJECT DETECTION

The System detects the object when the car is running in between the collision can happen so it will detect the object and stop the car and will display the message that the object is detected.

Ultrasound is an excellent way of figuring out what's in the immediate vicinity of your Arduino. The basics of using ultrasound are like this: you shoot out a sound, wait to hear it echo back, and if you have your timing right, you'll know if anything is out there and how far away it is. This is called echolocation and it's how bats and dolphins find objects in the dark and underwater, though they use lower frequencies than you can use with your Arduino.

3. FACE RECOGNITION

Once the enhanced frame is received, the face detection algorithm is applied to it. This is done with the help of Haar cascade file, it contains a number of facial feature template such as height, width, and threshold of the face. Since the face of the driver will occupy a large amount of frame that's why to reduce processing time we are specifying the detection of object of a particular size instead of detecting object of all possible size as it is default option for edge detection function in OpenCV.

4. EYE DETECTION

After detecting the face, the next step is to detect the eyes of the driver, and this is done by using same procedure which was used to detect the face of the driver. But here we reduce our detection area by marking a region of interest inside our frame. This region of interest is marked based on the points like, the eyes will occupy the upper part of the region but some pixels below from top and at some distance from the horizontally mid part of the region.

After marking the region of interest in frame the same edge detection technique is used to detect eyes. Since the operation is performed only in the marked region of interest, thus reducing the processing time.

5. DROWSINESS DETECTION

Once the eyes are detected, we concentrate on the eyes area and monitor the pixel values in that area. If the pixel values in that area is white that means the eye is open, if the pixel values of that area is not white that means the eye is closed. When an eye is detected to be closed a timer is started to count the total time the eye is remaining closed if this timer gets stop in a second or less that means the eye was blinked, if the timer goes above 5 or 7 seconds for both the eyes that will indicate drowsiness and an alert will be given via buzzer. A count of these alerts will also be stored in the system by which we are analyzing.

RESULT ANALYSIS

To test the simulation result of the system we used front ultrasonic sensor. By interfacing the overall system control circuit with proteus and loading the arduino compiler we have seen the simulation of our designed system and observed the following results. Simulation result for front sensor When front ultrasonic sensor reading above 50cm in real system it indicates that there is no any type obstacle near to the car and the speed of car is controlled with driver. When the reading of the ultrasonic sensor is read between 50cm & 45cm in the first step the light emitting diode (LED) is switched ON in real system it indicates there is obstacle on the way of the car but the distance is far and led blink 10 times and speed is decrease slowly. So the driver has enough distance to take measure and automatically speed of vehicle is reduced according to the reading of ultrasonic sensor. When the ultrasonic sensor reads from 45cm to 15cm in the next step still the speed of vehicle is reduced and LED blink 10 times to a vehicle is reducing its speed to backer vehicle. Again as the ultrasonic sensor reads below 15cm vehicle is automatic stop. This implies that the obstacle become closer to the vehicle and the driver does not have enough time to take measure. Simulation result for back sensor As described before we have used back ultrasonic sensor for alarming purpose only rather than braking. When back ultrasonic sensor reads above 50cm ranges from in real system it indicates that there is no any type obstacle near back to the vehicle. When the reading of back ultrasonic sensor is between 50cm & 30cm in the next step the green light emitting diode (LED) is switched ON and two read lights it blinks 10 times to inform decrease your speed to vehicle coming in back side. when the reading of ultrasonic sensor is below 30cm in the further step the buzzer is switched ON and red led is activated.

In the manual transmission, accident avoidance can be more important aid in constructing smart transport system in Bangladesh in near future.

The aim of this project is to decrease the accidents by controlling the speed of vehicles. This system is more efficient, and supportive to passengers. Since active RFID technology permits to detect the presence and identify of the vehicles reliably and sufficiently in advance, so corrective actions on the vehicle's behaviour can be taken. The vehicle speed is successfully controlled as a result of the detection of the signals, increase the driver's safety. In our project, only the test vehicles was present on the road.

CONCLUSION

This study shows the role of reducing vehicle speed automatically and its contributions to the safety of pedestrians and road users. It is found that the use of the vehicle speed control system contributes a lot in minimizing the accident rate that occurs due to the negligence of the driver to disobeying roadside signboards in special zones. When it comes to activities like driving, timing is what matters the most. That's why any system created to monitor drowsiness should be capable of generating the best possible accurate results in minimal possible time.

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We have seen that car accident is the current problem in both worldwide and in our country. we focused on, one of the common modes of accident occurs when two vehicles are traveling in the same direction, one going behind the other. We know that total collision avoidance is impossible but we can reduce it by small percentage. So we try to develop a car collision avoidance system by using ultrasonic sensor as obstacle detector microcontroller as processing unit of the system. Also we have designed overall control circuit for the system based on their specification, developed arduino-program for the microcontroller and interfacing the various components with proteus. Finally, we have simulated the system and obtain expected results. As shown in the simulation when we Varies the value of the ultrasonic sensor the system shows two stages; the alerting and automatic braking stage. The alerting stage by itself it has two steps lighting and sounding stages by using LED and buzzer respectively. When the obstacle is located in the alerting range either of the led or buzzer actuates depending on their limited range to warn the driver and when the obstacle is located on the braking range the dc servo motor reduces speed and braking will be applied to the car.

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Design and Implementation of AI Based Chatbot for Healthcare Assistance

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ABSTRACT

Medical services are vital to carry on with a decent life. Notwithstanding, accomplishing the discussion with the specialist for each medical issue is undeniably challenging. The thought is to make a clinical chatbot utilizing Artificial Intelligence that can distinguish the sickness and give essential insights regarding the illness prior to counseling a specialist. This will assist with diminishing medical services expenses and increment availability to clinical information through clinical chatbot. This chatbots are PC programs that utilization normal language to collaborate with clients. The medical services chatbot stores the information in the data set to distinguish the sentence watchwords and to settle on an inquiry choice and answer the inquiry.

Keywords: Healthcare, Artificial Intelligence

1. INTRODUCTION

Through this medical care chatbots individuals can speak with text interface and help answer through computerized reasoning. Ordinarily, a medical services chatbot will speak with a genuine individual. Chatbots are utilized in applications, for example, web based business client support, call focuses and Internet gaming. In this, medical service chatbots programs are worked to naturally draw in with got messages. Chatbots can be modified to answer the same way at a time, to respond diversely to messages containing specific watchwords and even to utilize AI to adjust their reactions to fit the circumstance.

Number of developing medical clinics, nursing homes, and, surprisingly, private focuses, as of now use online Chatbots for human administrations on their destinations. These chatbots associate with potential patients visiting the site, assisting them with finding trained professionals, booking their arrangements, and motivating them to get to the right treatment. In the event that any case, the use of man-made brainpower in an industry where people resides could be being referred to, in any case begins apprehensions in people. It raises issues about whether the undertaking referenced above should be appointed to human staff. In this medical services chatbot framework will assist clinics with providing medical care help online 24 x 7, it will answers profound as well as fundamental inquiries. It additionally assists with creating leads and naturally conveys the data of leads. By posing the inquiries in series it helps patients by directing what precisely he/she is searching for.

2. LITERATURE SURVEY

Here's the review in view of to perceive feelings order utilizing AI techniques. The examinations train feelings arrangement models from a great deal of marked information in view of repetitive brain organization (RNN), profound learning, and convolution brain organization. Semantic collaboration is generally critical to direct utilizing Natural Language Processing (NLP) and Natural-language age (NLG) to get discussion of clients. Here the multi-modular methodology is utilized of feeling acknowledgment. They have gathered corpuses to learn semantic data of words and address as vector utilizing the word vector, equivalent information on lexical are gathered. ^[1] A text acknowledgment talk bot is created in this paper. The inquiries posed to the chatbot are not perceived are additionally handled utilizing the master arrangement of outsiders. The web bots are made as web-companions in view of text, a client performer. In the event that the program isn't just text-based, prepared, they focused on the better framework here. Acknowledgment of information from the server reaction and handling of data. The server utilized here is a black box approach in light of SOAP. Utilizing a specialist framework makes it conceivable to work on limitless and independent insight. ^[2] This medical services chatbot expect to cause a correspondence to interface with human and machine. Here the framework stores the information data set to recognize the sentence and settling on a choice to address the inquiry. The chatbot information is put away in RDBMS. ^[3] The chatbot executed involving design in which the request for the sentence is perceived and saved reaction design. Here the creator depicts the execution of the chatbot Operating framework, programming, programming language, information base and how consequences of info and result are put away. Here the info is taken utilizing text () work and other accentuation is eliminated utilizing trim () capacity and irregular () work is utilized to pick a reaction from the information base. The chatbot is utilized for an amusement reason. ^[4] Here they use n-gram procedure for removing the words from the sentences. Here n-gram is utilized for examination and allowance of the contribution with case information involving Moro phonemes and phonemes as the choosing boundary. Likelihood examination for the nearest match is performed. The last articulation is diverted through a specialist framework. ^[5] The chatbot created here for medical services

purposes for the android application. The client sends the instant message or voice message utilizing Google API. Here the client finds just related solution from the chatbot. SVM calculation is utilized to characterize the dataset. Here the Porter calculation is utilized to dispose of undesirable words like additions or prefixes.^[6] The various records served in web, the substance is checked by labeling the dataset utilizing n-gram based low layered exhibition, TF-IDF lattice that creates S, U, and V lastly increasing the 3 networks cosine comparability is determined.^[7] Here the chatbot is made for the client care that capacity as general wellbeing administration. The application utilizes Ngram, TF-IDF and cosine comparability. The information base is brought up for putting away the issue and reply. The application obviously shows separated the watchword from the inquiry and by utilizing unigram, bigram, and trigram which helps in quick replying.^[8] Authors have recommended a structure which is utilizing R language to speak with Chatbot by utilizing AIML. In this, creators have proposed a model which is more reasonable for the instructive reason, thought behind this study is to give more intelligent way to understudy to get interface college system.^[9]

3. IMPLEMENTATION

While the innovation is creating in man-made consciousness controlled visit bots has existed for quite a while, another perspective piece spreads out the clinical, moral and lawful angles that ought to be see prior to applying them in medical services. And keeping in mind that the development of COVID-19 and the social separating, quarantine that goes with it has provoked more wellbeing frameworks to investigate and apply mechanized visit bots, the creators of another paper distributed by specialists from Penn Medicine and the Leonard Davis Institute of Healthcare Economics still urge wariness and care prior to continuing.

In view of the general novelty of the innovation, the restricted information that exists on chatbots comes principally from research rather than clinical execution. That implies the assessment of new frameworks being instituted requires steadiness before they enter the clinical space, and the creators alert that those working the bots ought to be sufficiently agile to rapidly adjust to input.

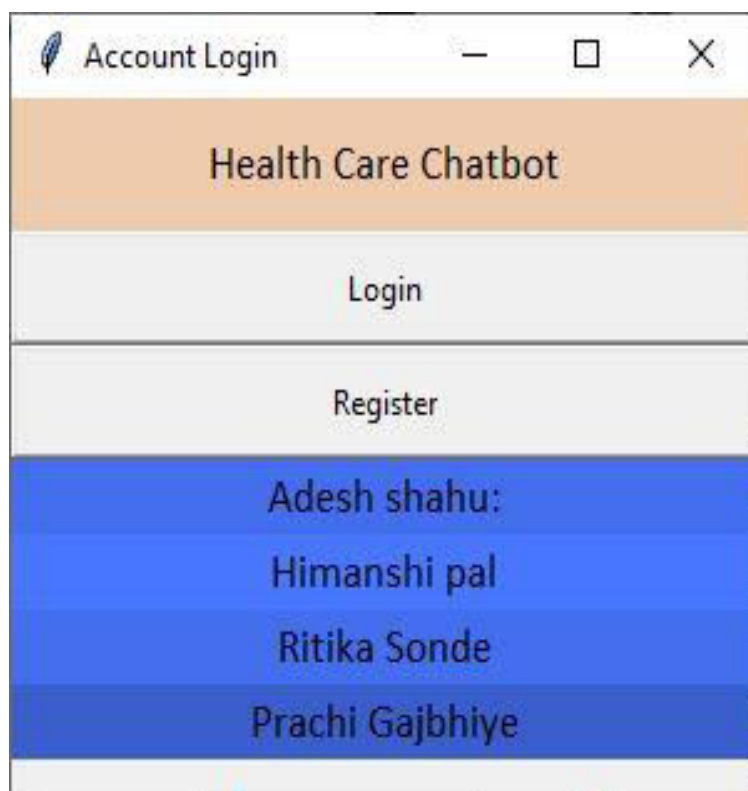


Fig 1: Homepage

This is an account login page or a home page of HealthCare chatbot if you have already register yourself then go for the login button it will take you on the login page in that login page you have to add your username and password and you can proceed further but if you haven't register yourself go for the registration button you have to click on the register button and it will take you to the registration page in that you can set your name and password after that you can proceed to next page.

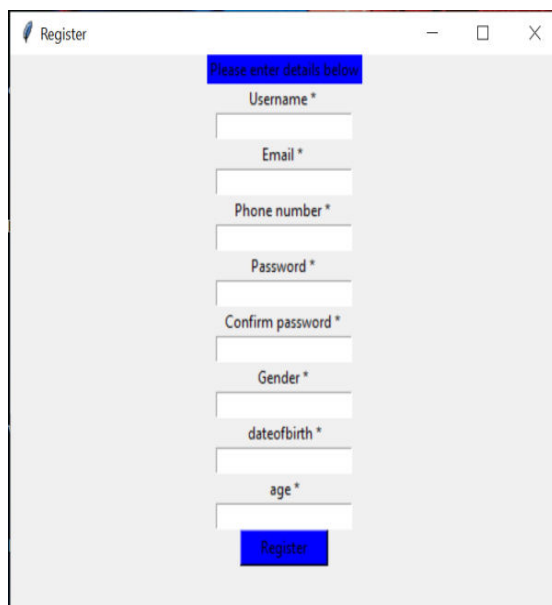


Fig 2: Registration page

Here, we have the registration page. As the registration page open, there are list of options for registration as shown in fig 2. Fill all the details as mentioned. Click on the register button you can proceed to the next page.

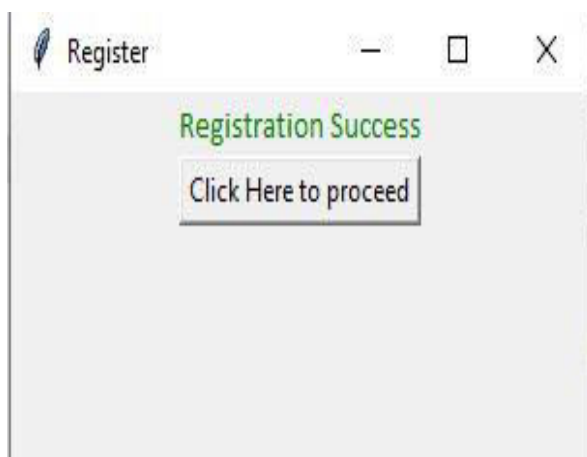


Fig 3: Registration success

After, registration you can see the registration success page, and Click to “click here to proceed” button, then you will proceed to next page.

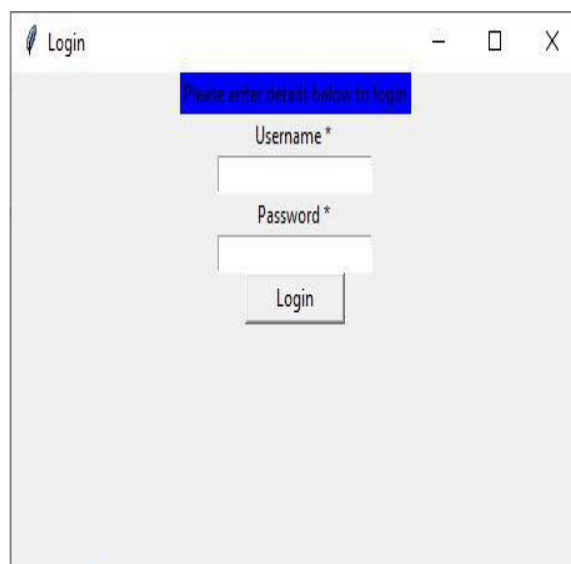


Fig 4: Login page

Here, display of login page. In login page, enter your name and password that you have set on the registration page, enter your name and password you can proceed to login button.

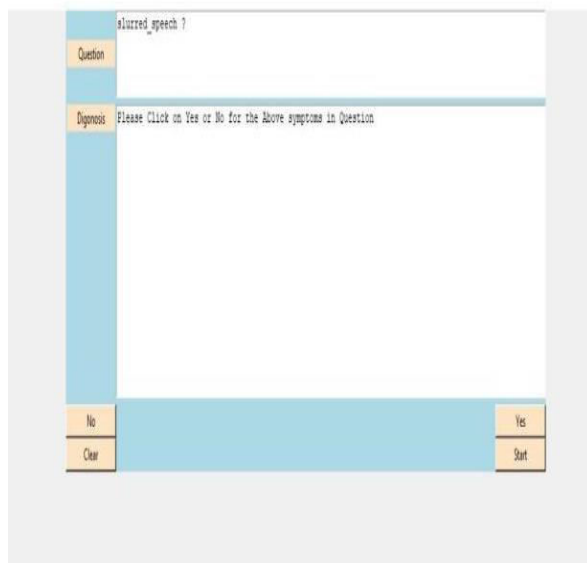


Fig 5: Interface page

Now, you can observe question and answer page in which you have to question your problem and proceed to start button and this will help you to answer your question and help you to cure.

4. Flowchart

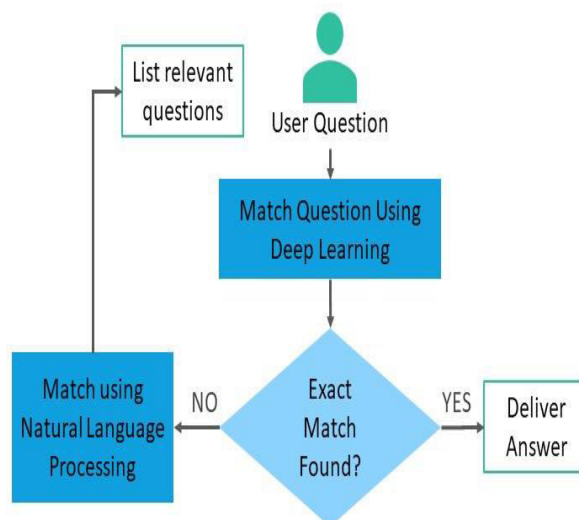


Fig 6: AI chatbot flowchart

5. CONCLUSION

In medical services Chatbot is an extraordinary apparatus for discussion. Here the application is too created to give nature of replies in a brief timeframe. It eliminates the weight for supplier by straightforwardly conveying the solution to the client utilizing a specialist framework. This undertaking is created for the client to save their time in counseling the specialists or specialists for the medical care arrangement. Every catchphrase is stacked down to get the appropriate response for the inquiry. The Web connection point is created for the clients, to the information question. The application is improve with the security and adequacy overhauls by guaranteeing client avoidance and characters and recovering responses thus for the inquiries.

6. Scope For Future Work

In our undertaking we will execute auto med AI medical services chatbot that create questions connected with wellbeing and illnesses and we can answer to this inquiries for medical services issues and as far as many inquiries pose by a chatbot we can answer this inquiries in the chatbox our AI medical care chatbot will actually want to foresee sickness and preventive measures and naturally propose favored specialist in the premise of anticipated illness.

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Designing An Android Application for Automation of 'Pay & Park' System

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ABSTRACT

Among the challenges that we face in our day to day life one of most unavoidable challenge is parking the car wherever we go. As our need increases our travelling increases but due to drastic increase in usage of vehicles and increase in population we face the tough task of parking our car particularly during busiest hours of the day. During peak hours most of the reserved parking area gets full and this leaves the user to search for their parking among other parking area which creates more traffic and leaves them with no indication on availability of parking space. To overcome this problem there is definitely a need for designed parking in commercial environment. To design such parking slot we need to take into the account of reservation of parking slot with optimal parking space which depends on cost and time. Additionally, four hours prior to his expected arrival, the user can prebook a slot in the area he desires if it is available. This will help reduce the load on the administrator as his physical work reduces drastically and user can search the parking slot through Android Application. Payment services are made available using Google Wallet, so the user is required to own a credit card or debit card. Application relieves the user from the hassle of manually searching and waiting for empty slots to park the vehicle.

INTRODUCTION

1.1 Motivation: The increase in city traffic is one of the major effects of population growth especially in urban areas. Due to this searching for a vacant parking area during peak hours is not only timeconsuming but also results in wastage of fuel. The drivers keep searching for suitable parking lot which leads to increase in traffic. Increasing volume of vehicular exhaust creates a negative impact on the environment. Hence reservation-based smart parking has become the need of the day. Parking is an essential component of the transportation system. A typical vehicle runs for one hour on an average and is parked for 23 hours in a day. It is also important to consider that a typical vehicle usually needs three different parking spaces-one at the owner's residence, second at owner's office/business place and third at recreational/entertainment facilities.

1.2 Problem Definition: The Smart Parking Application aims at helping users to find the most suitable area for parking make reservations and extend them, if required. It enables parking administrators to define and manage parking spaces as well as enables parking operators to authenticate users against their reservations when users enter the parking area. Users access location based information and request system services via mobile applications and parking operators verify reservations via mobile applications whereas parking admins may manage the parking area details via a web application.

1.3 Relevance of Project: In order to satisfy the increasing demand for the parking areas, parking management organizations are trying to implement better and technologically advanced solutions. A variety of methodologies have been implemented abroad to disseminate parking availability information through various platforms. The smart parking application will enable real-time parking availability checking and reservation thereby providing a hassle-free parking solution for users.

LITERATURE REVIEW

Current Systems for smart parking includes: Smart parking using RFID [1] : RFID technology is an automation technology with main components as RFID readers, labels, computers, barriers, software etc. The software is for management, controlling, transaction reporting and operation tasks for parking lots. This vehicular data is fetched from database to verify a vehicle when it enters the parking lot using RFID reader. When a vehicle wants to check out, the authentication is done by analysing check-in details. The drivers will be notified about the availability of parking lots at the entrance itself. Hence, no time is wasted looking for park space.

Reservation based smart-parking [2] : Reservation based smart parking system aims at broadcasting real time parking information to drivers via an application. The system mainly uses Zigbee sensors and smart phone support for deployment. This system enables the users to reserve a particular parking space in advance by accessing its availability information in specific parking district. It is also equipped with payment option including dynamic pricing for users. Light and vibration sensors detect whether a vehicle is present in the lot. Bluetooth module is responsible for communication between user and the sensor information. The major disadvantages include shorter range of bluetooth and bottleneck situations may arise in case of heavy traffic.

Smart parking reservation system using SMS [3] : This system enables users to reserve their parking places using SMS. Once the reservation is confirmed, the users will receive the one time password(OTP) to enter the parking area and the lot number for parking. If they exceed the time to reach the parking area, the password will expire and the reservation will be cancelled. The system is subdivided into Reservation and Access system. The reservation is handled by a micro-RTU (Remote Terminal Unit) configured with SSE OPC (OLE for Process Control) Server. The access system is handled by a microcontroller-IC16F877- which measures time periods for validity of passwords, stores/provides information on the availability of parking spaces as well as allowing or denying access to the parking area. A weight sensor is positioned at the lot area to sense the presence of the vehicle.

ParkNet : Drive by sensing road-side parking statistics [4] : ParkNet is a mobile system comprising of vehicles that collect parking space occupancy information by driving by. The vehicle includes a GPS receiver and passenger-side facing ultrasonic rangefinder to determine vacant parking spaces. The data collected is integrated at the central server producing a real-time map of parking availability thereby serving user's requests. In order to achieve accuracy of location, environmental fingerprinting approach is devised. It makes use of GPS module and ultrasonic sensors for end to end communication. A real-time map is generated to reflect the occupancy with respect to a timestamp. The drawbacks are mainly due to limitations of sensors and complexity involved in cases of multi-lane parking.

Drawbacks of Existing Systems

Rfid System: This system is considerably expensive. The RFID tags are application specific, no one tag fits all, more than one tag can respond at the same time. This system fails in case of internet disconnection. If two vehicles enter a parking lot side by side, being within the range of the RFID reader, the system will not read their identification information and process it. Electromagnetic spectrum signals are relatively easy to jam using energy at the right frequency.

Reservation Based Smart Parking System: The reservation based smart parking system is expensive and also difficult to maintain. The problem of bottleneck may occur due to heavy traffic.

Smart Parking Reservation System Using Sms: The system is a standalone system i.e. The system is designed for individual use by parking areas, and not a centralized system encompassing reservation for all parking areas within a region. As the system uses CMOS flash memory for storage of parking information, the database can be scaled within hardware limitations.

Parknet: Drive by sensing roadside statistics Errors in providing accuracy of locations and occupancy. It is expensive and more complex due to lane detection mechanism. If the vehicle does not move within a specified speed range there may occur failure of ultrasonic sensors to detect distances.

Current parking systems contained in office buildings, malls or public parking lots using automated parking gate systems use systems that only provide information on the length of the driver's parking and the vehicle images used to obtain cost information to be paid. In the existing system there are some problems where drivers sometimes do not get parking because parking attendants do not know that the parking lot is full. In addition, the other problem is that drivers sometimes do not know whether when he gets into the parking lot he will easily get an empty parking lot so it does not take long to park and does not make the driver exhausted to find parking. The current system still leaves the driver confused whether the parking lot is full or available. So when the driver picks up a ticket, he thought that the parking lot is available.

Proposed System for Implementation

Starting the Application: The user needs to install the application on his android based device. after installation, the icon of the app will feature on the home screen of the user's device.welcome screen will be flashed to the user on opening the application. The proposed system is the combination of smart parking and the Slot allocation with the Android application. In the existing system, a dynamic algorithm is carried out, which is a random allocation method. It randomly allocates parking lot to the users.

Registration: Initially, the user has to register his details with the application for the first time. This is a onetime registration. The user has to enter details like username, gender, phone number and email-id. All this data will be stored on server. Booking for slots mandatorily has to be done four hours prior to arrival.

Selection of Location for Parking: The client is provided with multiple parking locations. Client has to select one of the locations provided where he desires to park the vehicle.

Select Vehicle Type: After selecting the location, options for the vehicle type is provided i.e. 2-wheeler or 4-wheeler alongside the rate chart for parking charges is prompted.

Availability Status of the Slots: Based on the type of vehicle selected availability of the empty slots will be displayed along with the total slots reserved for that vehicle type. Colour coding is used to indicate empty v/s reserved slots. Green indicates empty slots and Red indicates that currently there are no empty slots for reservation.

Enter User's Details for Slot Reservation: In case the slot is available, the client can proceed further with the reservation & payment process or else he can go back to change the location/vehicle type or else can terminate the entire process.

Confirmation: On successful reservation, a confirmation page with user details is shown which is editable.

The smart parking application is collectively implemented in following modules:

- A) **Website for the Administrator:** - Website enables Administrator to perform functions: Add, View and Edit a parking area.
- B) **Mobile Application for the End-user:-** Mobile Application for the Operator helps in Authentication and Billing functions.
- C) **Mobile Application for the Parking Operator:** - Mobile Application for the End-user provides functions – Search, Book, View, Cancel slots.

A single database stores information regarding parking areas, users and their reservations. The database consists of tables: admin, operator, parking area, parking lots, parking session, user, user_cars.

Administrator Functions

1. **Add Slot:** On selecting an area on the map, its latitude and longitude is obtained by the system and then the admin has to fill in the remaining details.
2. **View Slot:** On selecting a marker on the map, the admin can view the details of that parking area.
3. **Edit Parking Area Details:** The admin can edit the parking area details by editing the form displayed after viewing the slot.

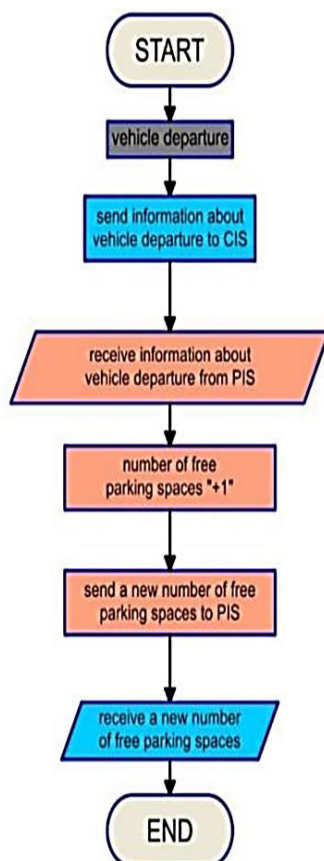


Figure 1: System Flowchart

Operator Functions:-

1. **Authentication:** When user enters parking area, operator verifies reservation using session id and car number of the user. Before Authentication (when the user arrives at the parking area), the status of parking lot is „booked“ which is later changed to „occupied“ when the user enters the parking area after authentication.
2. **Billing:** The operator enters the car no and session id to get the bill generated for a particular through the mobile application. On billing, out-time registered, bill amount calculated and updated, status changed to „finished“ and Parking lot status changed to „available“ and total number of parking lots in the given parking area are incremented.

End-User Functions

1. **Search Parking Area:** On selecting a location, user can view detailed list of parking areas, their availability and the pricing.
2. **Book Parking Lot:** The user is required to enter id of the required parking area and duration of reservation to book a lot as per availability. After booking, a unique session id is given to user to confirm booking.
3. **View Booking:** The user can view his current booking details like location, session id and status of booking through the end user’s application.
4. **Cancel Booking:** The user can also can his current booking. On cancelling, parking session status becomes “cancelled” and availability of slots gets automatically updated.

FUTURE DIRECTIONS

The Application can be developed for other popular mobile operating systems. In future, our application can be implemented on the existing operating systems like iOS, Windows and BlackBerry also on the upcoming and promising operating systems like Firefox OS, Jolla and Tizen. Our application can be used as an alternative to the present parking systems in malls, at railway stations, near airports, theatres, etc. as an efficient means to park. Online Wallet can used to make secure payments fast and convenient.

Electric vehicles, which add another measurement to in determining how quickly cars leave their parking spaces, with charging credits (such as accessibility of charging stations, time and charging term, and evaluation and energy markets) becoming a key factor. Autonomous vehicles, which will generally change the use of vehicles and how they leave parking spaces through self-leaving abilities and mechanical valets.

Conclusion: The present time brings us a constant increase in the intensity of road traffic. This problem brings strong negative externalities of urban transport, such as environmental pollution, noise, congestion, and traffic accidents resulting from high traffic density. Solutions for this problem are always time-consuming and expensive. In historical centers of Slovak cities, it is not possible to build new parking areas anymore. There is no more space, so there is only one more option. We should improve the efficiency of parking. Due to advancement in technology, drivers are demanding easier and less time-consuming parking facilities. There are various methodologies of smart parking that have been implemented to provided better services to the end users and improve the overall management of the existing parking system. The real time monitoring of available parking lots and allotment of the suitable parking area by advanced reservation are some of the characteristic services provided to the customers or end users through a user friendly interface like a mobile application or using SMS services. After analyzing the different solutions, it is observed that there are some drawbacks of each system like excessive use of expensive sensor modules, difficulty in sensing accurate parking availability data due to speed constraints of the vehicle, use of certain modules like Bluetooth that function efficiently only for short distance, inefficient user authentication techniques and centralized management of the database of parking areas in different regions. These drawbacks need to be eliminated to enhance the overall performance of the system.

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A Secure Model for Preventing Data Leaks Using Sha1 and Blowfish Algorithm

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ABSTRACT

As we are moving forward in the digital era, security is becoming a major issue. With everything available online, from storing data to browsing anything in the world from anywhere. Businesses are now using the digital platform to store the company data. This data may contain confidential information, employee's details and customer's information. In order to secure the confidential data, we are introducing a software containing six different encryption and decryption algorithm. The user/business will encrypt and decrypt their data with any one of the algorithms.

Keywords: Data leak, Data leakage, Encrypt, Decrypt.

I. INTRODUCTION

Today the world regularly depends on transfer of information i.e. transferring data from one individual to another person. The data transferred to the distributor must be secured, confidential and must not recurrent as the data shared with the authorized third parties are highly important and confidential. The proposed model for the transmission of the data deals with data encryption and data decryption. But the sender also must ensure that the correct, private data must be sent to the right receiver.

The proposed model works upon the Secure Hash Algorithm generally known as the SHA Algorithm. In general, SHA is a group of Function which are used to encrypt the data which is to be communicated between to organizational bodies. SHA Algorithm has its versions.

Data security is a major issue faced by many organizations and businesses. Companies stores crucial data related to the business, employees or customers which if leaked or went into wrong hands may lead to misusing of the data. There are various ways through which the data can be leaked, one of which is sharing data with company stakeholders or any person that is authorised to access the data. In this case it is very hard to identify the culprits through whom the data is leaked. The other way of data leakage is through hacking. Everything has gone digital now, internet connectivity is available to all organisations which makes it easy for external forces to hack into any system and retrieve their personal data. In order to stop the organisations data from being misused we are introducing a software. These software gives the user/organization various encryption algorithms through which they can encrypt their data.

The date will be encrypted by using different types of algorithms which are MD5, SHA1, Hashing algorithm, SHA256. These are all different hash functions.

A cryptographic hash function has a very crucial role in cryptography to achieve certain security goals such as authentication, security. The reason behind using 6 different types of algorithms is that the person who is in charge for the data of the organisation can use any one of the algorithms that he/she is familiar with. Since all of them are hash function but they are unique from each other, for example MD5 produces a 32-character message digest, while SHA1 produces a 40 characters hexadecimal. Also, each algorithm has a different speed compared to each other as SHA1 is fastest hashing function than SHA256.

Our main idea behind this whole project is that the data for the company's should be kept safely from the third-party users so that any kind of malpractices cannot take place and also if by any chance the data gets leaked it will be encrypted by using our software and hence the leaker will not be able to identify or decrypt the data easily and we can easily protect our data.

II. LITERATURE SURVEY

The analysis in the field of data security has resulted to a number of methods looking subsequent to leakage detection.

Author's Name	Year of Publication	Description
Riya Naik, Manisha Naik Gaonkar	2019	In this research they have described the technique using which a distributor can correctly hand out record to the user to

		raise the probability of exposing a guilty user.
V.Vijayalakshmi, T.Rohini, S.Sujatha, A.Vishali	2010	In this research they have provided security of data during its dispersal or transmission and also detected if the data gets leaked and who is the culprit.
Neeraj Kumar, Vijay Katta, Himanshu Mishra, Hitendra Garg	2014	In this research they have portrayed division and replicaton of data in the cloud for Optimal Performance and Security which fragments owner's files into numerous blocks and replicate them into the cloud area.

III. PROPOSED SYSTEM

The data owner encrypts the file before sending it to the Cloud Service Provider. The encryption algorithm has several steps and composed of key Chooser, Circular Array Inverter and Circular Array shifter [7]. The encryption algorithm is designed, the information at highest factor by applying series of rotations on every block character and the key is rotated for every character. From this it is ensured that same key is not used for encrypting every character and hence this algorithm is called as key motor encryption algorithm. The file is divided into blocks and confidentiality is emphasized on every character level of a block. The binary equivalent of block character is stored in circular array and number of moves the circular array is rotated is decided by the CA Shifter. Where every rotation divides the data by 2 and this will optimize the data to its least value and hence the privacy of data is ensured [6]. Since stepper movement of CA is different for different character it's hard/impossible to determine [5].

ENCRYPTION

Step 1: Choose the encryption mode and provide a valid path of the data that needs to be encrypted.

Step 2: Checks for the validity of the file.

Step 3: Request for the passkeys.

Step 4: Combine the various keys and hash them to produce the resultant passkey.

Step 5: Encapsulate the data to avoid any loss and archive it.

Step 6: Encrypt the data and break it into small chunks to disassociate the entire data.

Step 7: Encrypt each chunk with the passkey and archive them as one.

Step 8: Encrypt the archived chunks of data for the final time and assign the file an extension for additional security.

DECRYPTION

Step 1: Choose the decryption mode and provide a valid path for the encrypted file.

Step 2: Validate the file and check for the proper extension.

Step 3: If the file is valid and the path available, accept the initial number of keys that were given during the encryption.

Step 4: Since the data is already encapsulated the data loss is negligible, perform decryption on the file and release the chunks of data from within.

Step 5: Decrypt the chunks and assemble them back in the initial position.

Step 6: Compile the chunks to form a single entity and perform the decryption for the final time.

Proposed method includes the methods of encryption and decryption. Various businesses and organizations can use this system to secure their confidential data. Distributor will be Company personnel is responsible to distribute data to third parties. Distributor has functionalities of adding agents, storing data, distributing data, tamper detection and finding attacker agents. Agent or client will be third parties who are involved in business.

and receive data from distributor which could be mailing list, employee salaries, multimedia data, etc. The primary step of data transfer phase is information retrieval and encryption [2]. Information about the data is obtained which identifies the data uniquely. Once the information is retrieved, message (MS1) is created using retrieved information and recipient's client ID. Additionally the message is encrypted utilizing symmetric key encryption i.e. Advanced Encryption standard (AES) algorithm to avert any tampering to the information. AES Algorithm is considered to be more effective for stenography purpose as it works more rapidly than triple DES. AES has inbuilt flexibility in key size. In AES, key with 128 bit key length uses 10 rounds, 192 bit key length utilizes 12 rounds and 256 bit key length uses 14 rounds. Each round uses different key generated from original AES key.

IV. IMPLIMENTATION

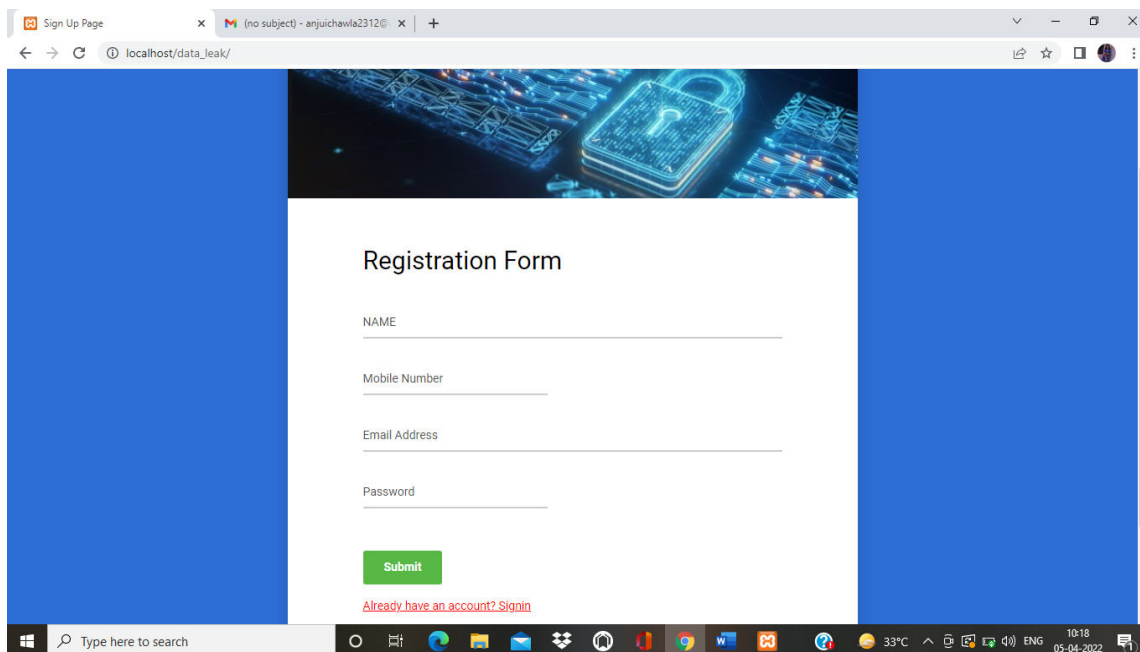


Fig 1: Registration Page/Login page

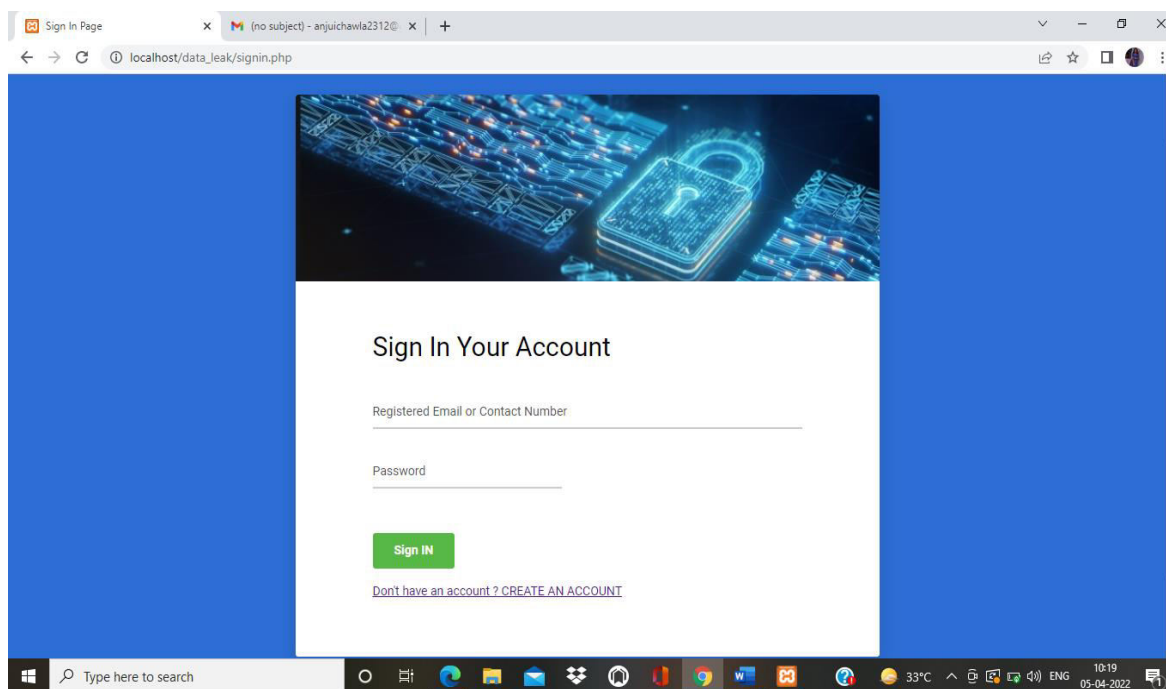


Fig 2: Sign in Page

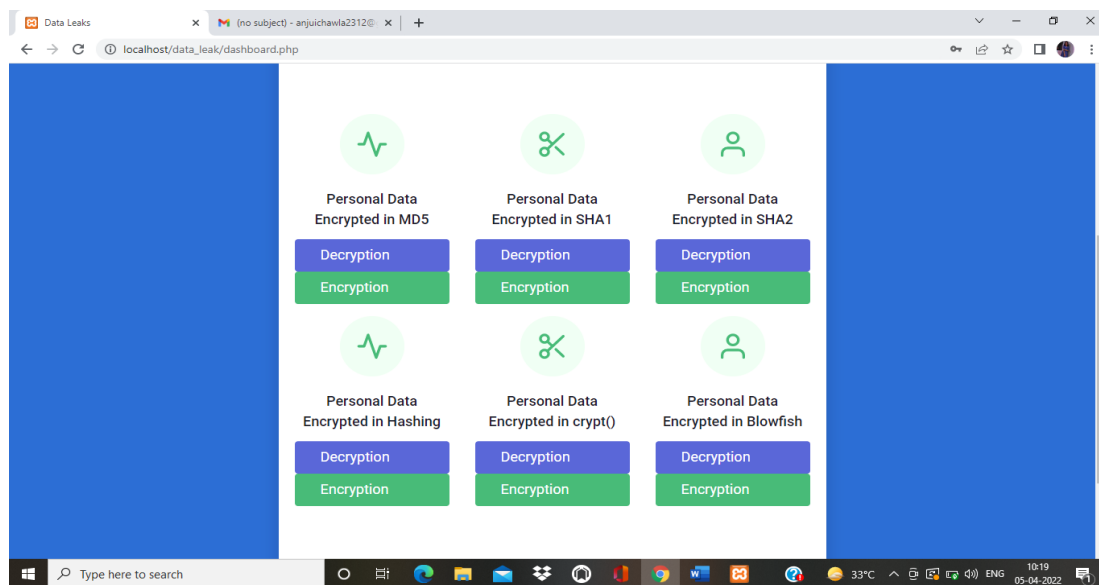


Fig 3: Dashboard

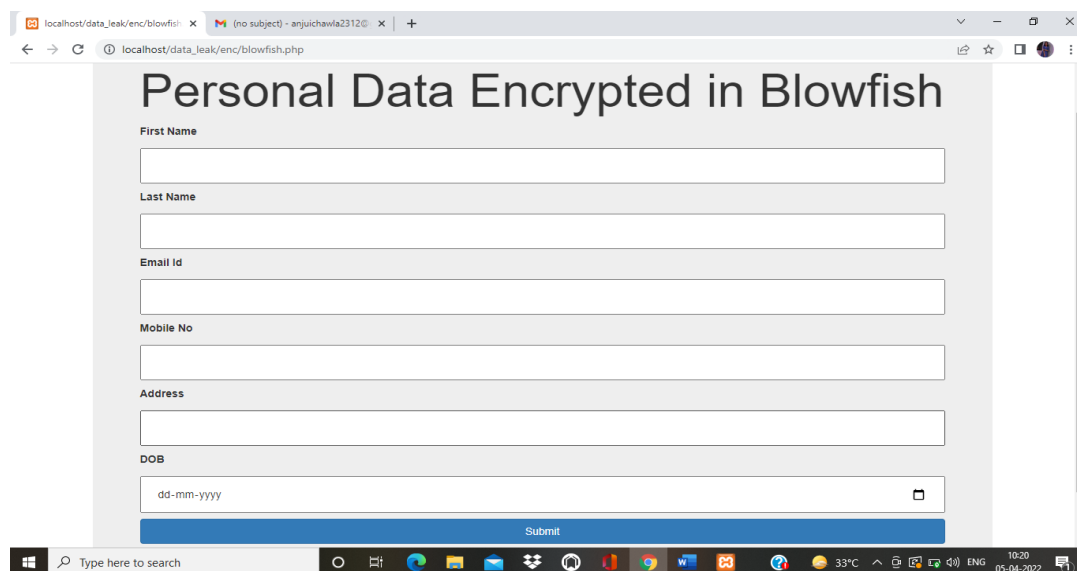


Fig 4: Blowfish Encryption Algorithm

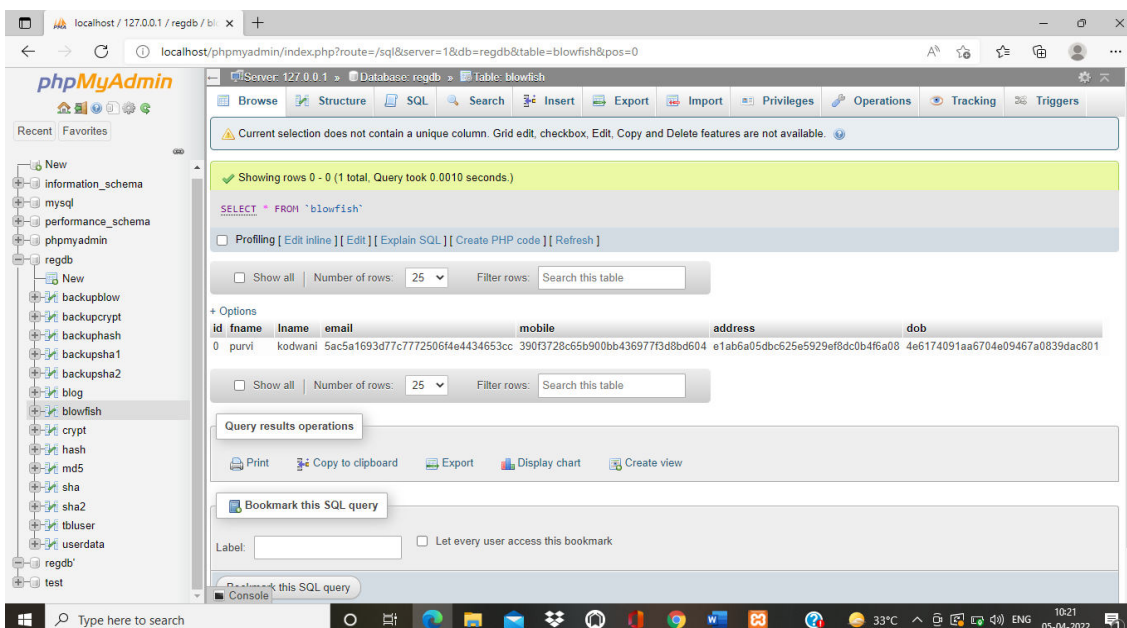


Fig 5: Database for Blowfish

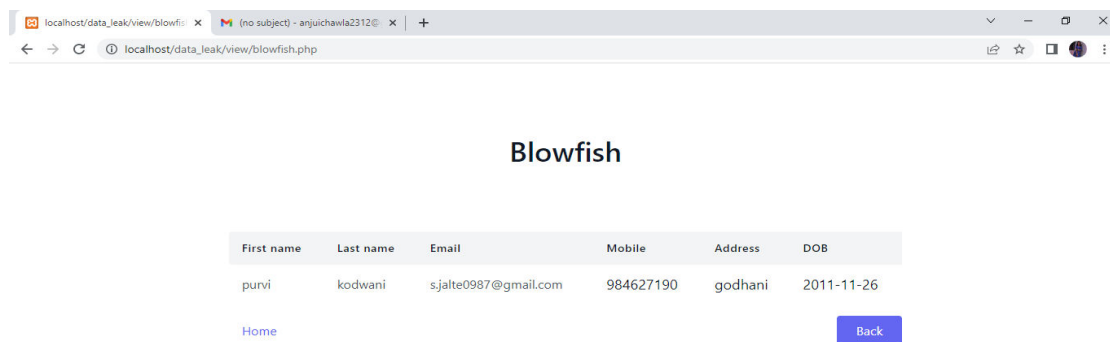


Fig 6: Decrypted Data in Blowfish Technique

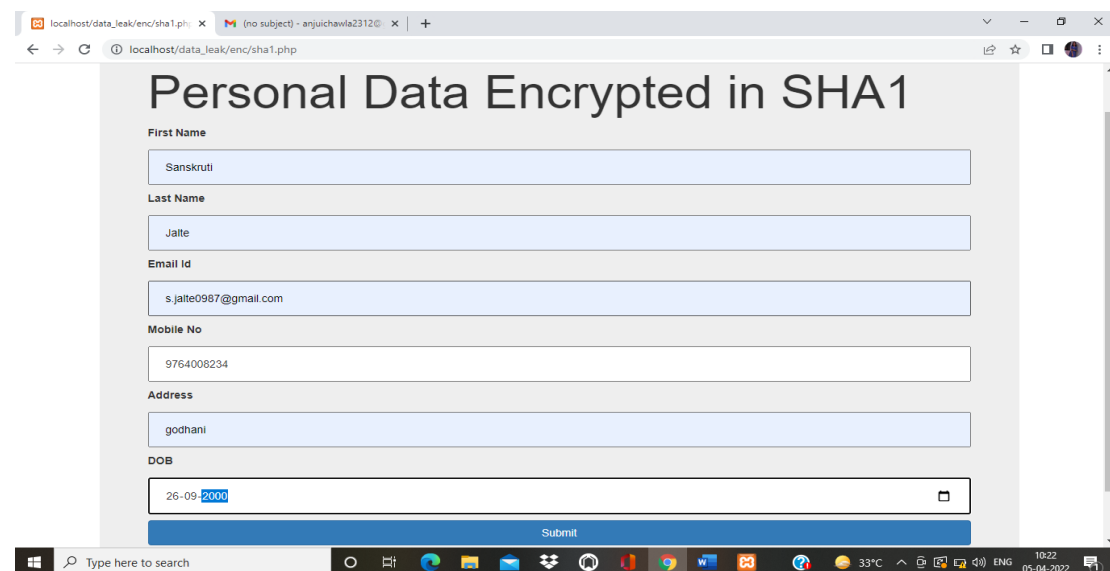


Fig 7: SHA1 Algorithm

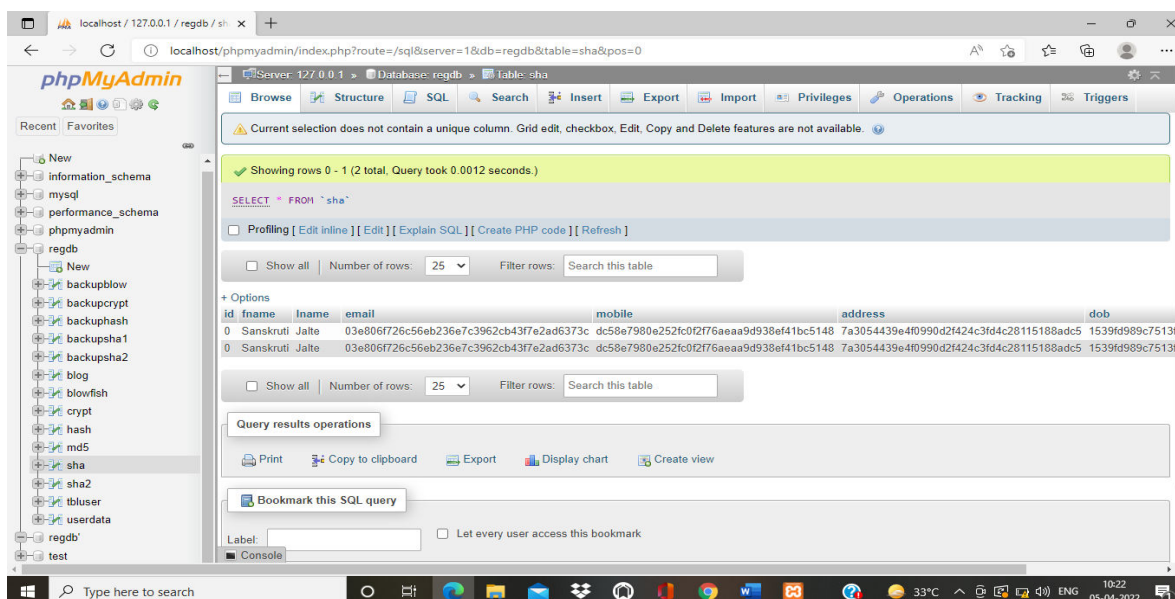


Fig 8: Database for SHA1

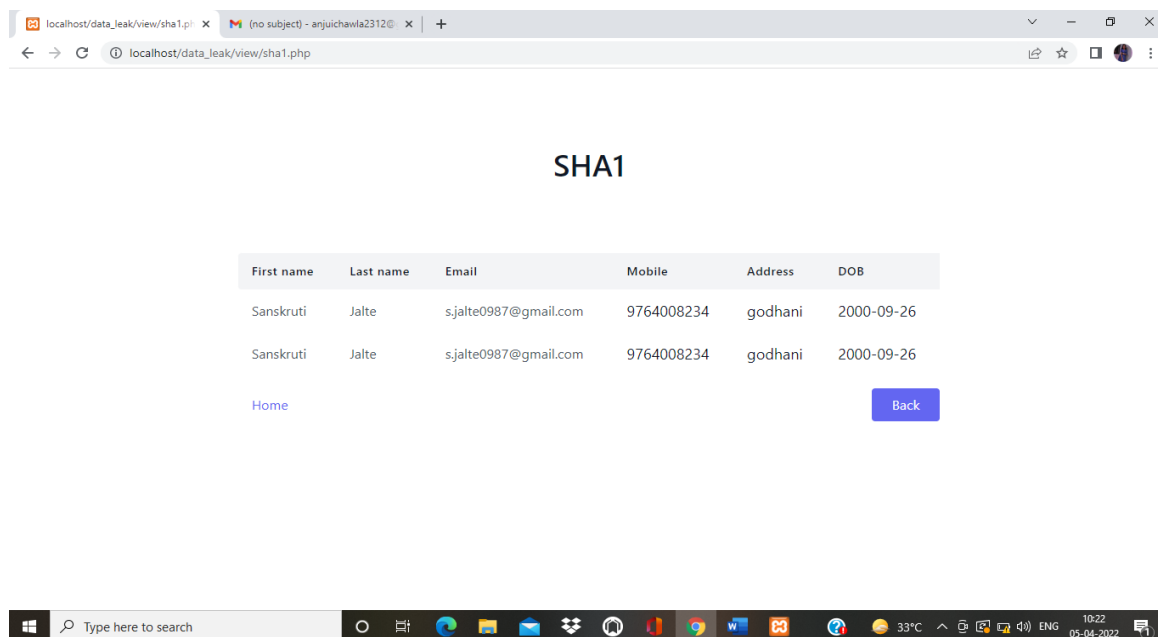


Fig 9: Decrypted data for Sha1 technique

V. CONCLUSION

The proposed journal can be concluded with the fact that the given model comes along with solution to problems of data leakage and the security of the data being transmitted.

Preventing sensitive data from being compromised is an important and practical research problem. The algorithms in this project achieve precise results by discounting fields that are repeated or constrained by the protocol. Specifically, in our scheme tags should be authenticated by the client in each protocol execution other than calculated or prestored by the client.

The proposed technique will provide better security against data leakage problem. We can detect the data which is leaked in real time by using this method. It also secures different types of active and passive attacks like SQL injection.

The proposed technique is computationally cost effective in terms of time and space users. Therefore, this can be useful in distributed computing environment to protect data from data leakage.

The proposed technique is based on MD5, SHA1, SHA2, Blow fish, Hashing, Crypto algorithm.

VI. FUTURE SCOPE

As we have seen that this proposed model enhances and advances in the security and detection of data leakage and even stands with the possibility of what data has been leaked.

We have shown it is possible to assess the likelihood that a user is responsible for a leak, based on the overlap of his/her data with the leaked data and the data of other users, and based on the probability that objects can be 'guessed' by other means or by some means of other techniques.

The model used here is relatively simple, but it does capture the essential trade-offs. The algorithms we have presented implement a huge variety of data distribution strategies/techniques that can improve the chances of identifying a person in further research work.

We can demonstrate this for dynamic block level operations on some encrypted data blocks for various operations such as insertion, deletion and updating, which we consider is our improvement for our work.

The future scope of the proposed work includes easier accessibility for non-technical users by providing a Graphical User Interface (GUI) level interface.

Our future work includes the investigation of the agent guilt models that capture leakage scenarios that are not studied in this paper.

An Anti-Piracy System for Preserving the Authenticity of Software

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ABSTRACT

Software piracy has become a major problem for software industries. Piracy is rampant on the web that causes a substantial risk to software outcome manufacturers. Intruders can get the direct access to the software by the virtue of manipulated codes and certain set of programs and can pilfer the important information of users or of an organization. Consumer crime is generally believed to damage both software firms (low profits) and customer purchases (high prices). This paper is aimed to sustain cyber-crime prevention and ensures that the software is being accessed by only registered authorized users.

Keywords: Unique I'd, Key generation, Copyright, Authorization, Prevention, Infringement.

8. INTRODUCTION

Software is a necessary requirement in today's modern world of technological development. Copyright infringement is becoming a major concern in today's world, which is why anti-pirated software is so important^[2]. Piracy is rampant on the web, and cause a serious effect of the organization^[1].

Unauthorized copying of programs is accessible over the web and financially poor users are unable to get the software license becoming the considerable cause beyond the growth of copyright infringement^[10]. Software piracy continues to grow worldwide due to lower price and effortlessly can be clone^[5]. The consequences of piracy raise are ruinous^[2]. Through the medium of viruses, intruders can directly approach to the software and can pilfer the data^[9]. Software hacking involves the use or dissemination of information without the express written consent of the software author^[7].

The biggest issue of copyright infringement have imperil of worms and harmful programs to the software system which leads to damaging software liability and data become unusable^[12]. The impact of crime has risen on the manufacturer agencies dramatically, reducing their effectiveness^[5].

This is a misnomer for software companies / manufacturers, people who copy the original outcome unlawfully and share it to many users that don't have valid licenses to get the access in another system without proper registration to the system^[6].

- Registration process: Users of the software must register them with the system at very first time.
- Unique key generation: System will automatically generate random alphanumeric code.
- PC I'd generation: PC will then read the MAC address of the system to authorize the user registered with that system.
- Data matching: By entering required information system will check the authenticity of the user.
- Authentication: If all the required information get matches then the user can get the access to the software.
- Not supported on another PC: Even if the user are same but the PC will not accept User-I'd and password for that system. The user have to register on that PC first.

9. RELATED WORK

Rasch and Wenzel worked on a two-sided market setting of the impact of software piracy, which includes software platforms that attract developers and users to maximize their profits^[8].

Martínez-Sánchez analyzed the government and incumbent role in preventing the pirate entry. The framework used a sequential duopoly model of vertical product differentiation with price competition. The results show that both the government and the incumbent have a major role in preventing pirate entry^[10].

Chang et al. presented a study that examines the factor effects of software piracy at the country level. From their study, it was found that economic development, trade, education, freedom, regulatory protection, and computer penetration all drastically affect the level of software piracy within the country^[2].

10. METHODOLOGY

The Mersenne Twister is a strong general purpose pseudo-random number generator^[11]. The Mersenne Twister is a common objective of producing random numbers^[4]. The Mersenne Twister algorithm confirms quickly high-quality production of pseudo-random integers that pass random statistical tests^[12].

The integer portion of the Mersenne twister algorithm does not involve any arithmetic in the sense of addition, subtraction, multiplication or division^[11]. All the operations are shifts, and's, or's, and xor's. The last element of the state is a pointer into the cache. Each request for a random integer causes an element to be withdrawn from the cache and the pointer incremented^[4]. The element is "tempered" with additional logical operations to improve the randomness. When the pointer reaches the end of the repository, the repository is replenished with another 623 elements^[8].

All the elements of the state, except the last, are unsigned 32 bit random integers produces a sequence of 32-bit integers that only repeats itself after 219937 – 1 number have been generated^[6].

11. IMPLEMENTATION

The main motive behind this system is to prevent information and product from being copied. It helps to prevent the software and source code from stolen by unauthorized user^[3]. It provide protection to the software from malicious codes which can implement various types of viruses and worms in the system^[5].

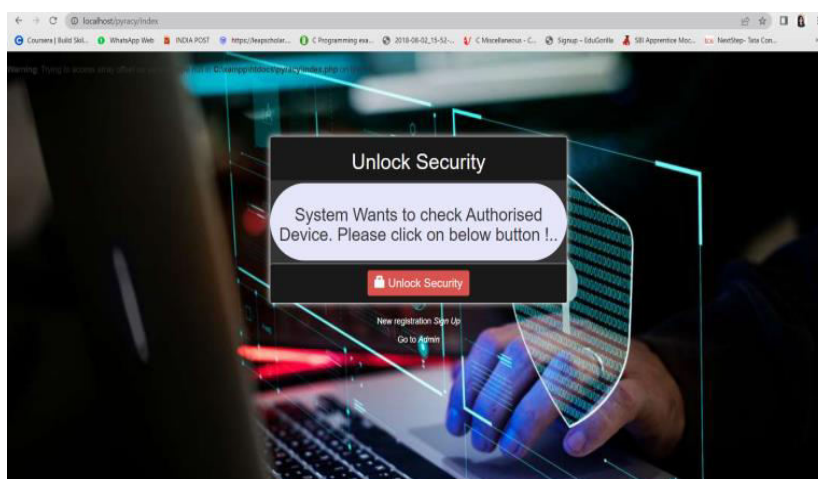


Fig 4.1: Security Page

Here we have a sign up page for registration of user to the system.

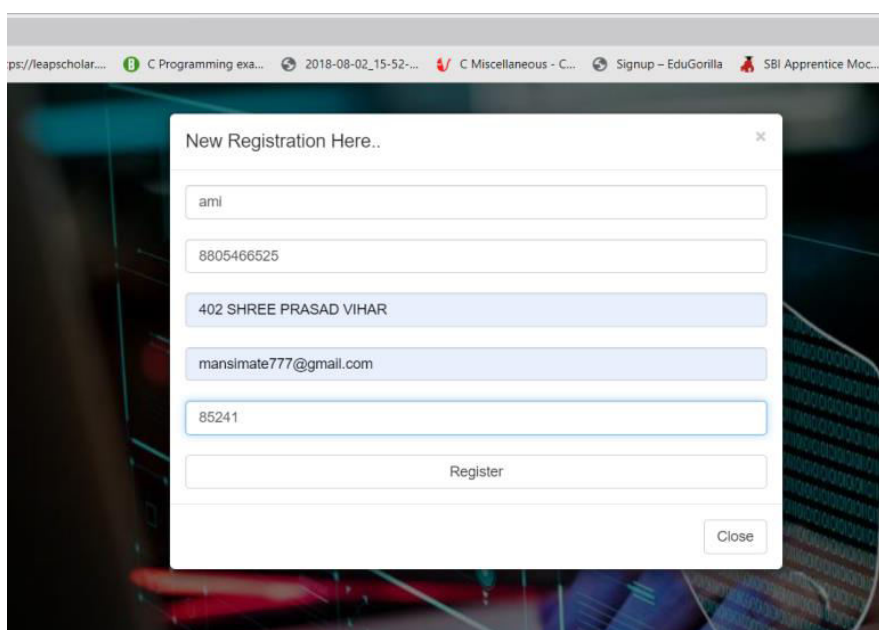


Fig 4.2: Registration Page

After successful registration system will generate an alpha-numerical unique key for that system using mersenne twister algorithm which is applicable to that system only.

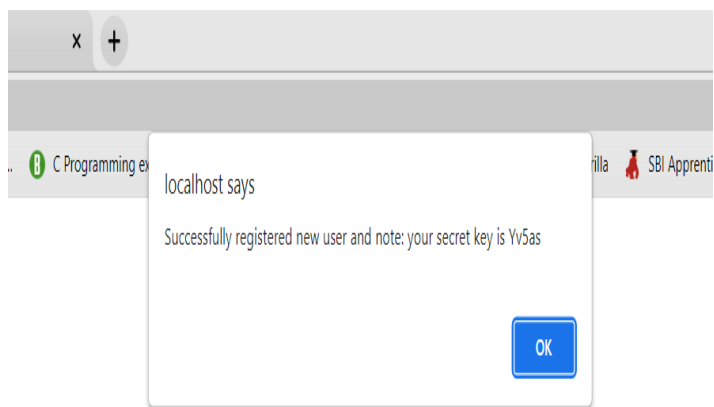


Fig 4.3: Key generation

Now the system will then read the PC id and check authenticity of that system.

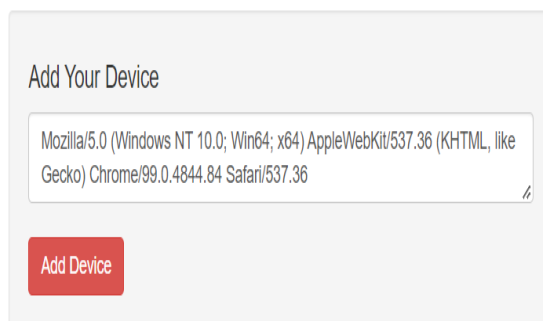


Fig 4.4: PC id reader

After that the user have to log in all the credentials again for successful registration process.

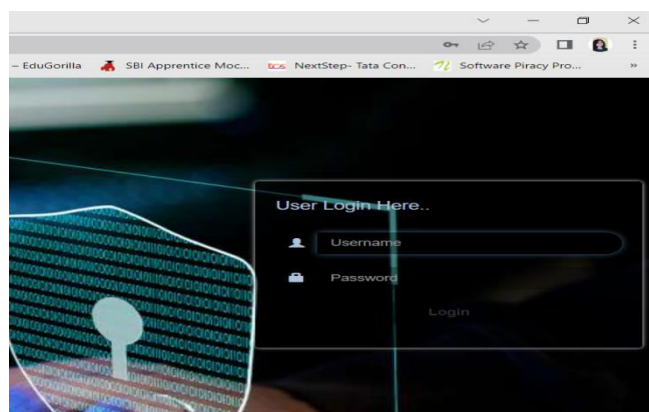


Fig 4.5: User Login page

And lastly user have to enter the unique key which is provided by the system to enter into the software.

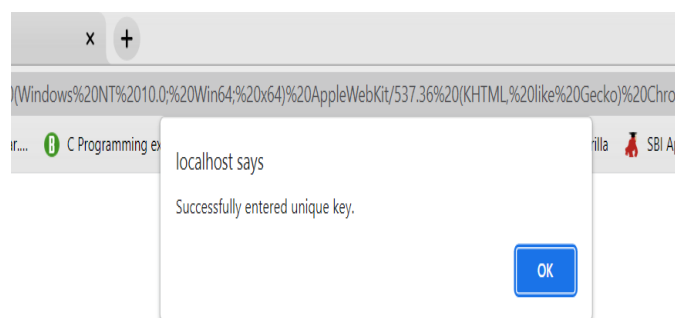


Fig 4.6: Authentication checking successful

ADMIN MODULE

Admin module will store all the data in the database that entered by the user. All the credentials that entered by the user like name, contact, password, unique key etc are kept updated in database as user keep changes the data.

Admin module can solve all the queries ask by the user system.

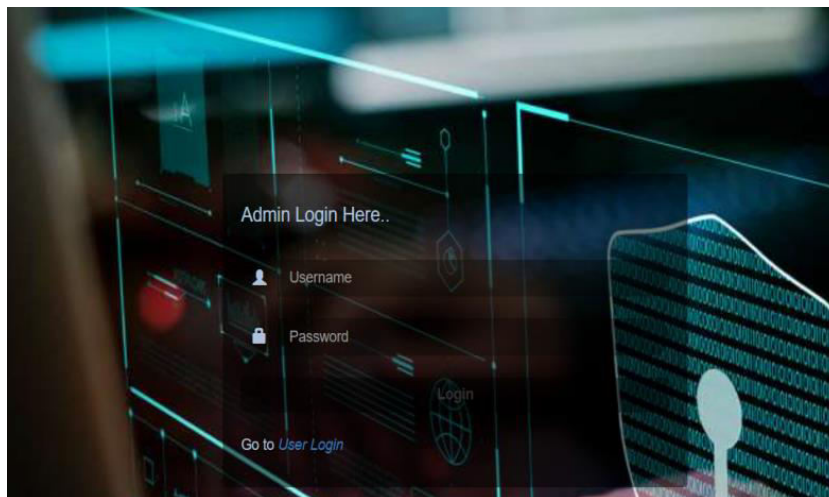


Fig 4.7: Admin login page

It shows the data entered by the user and list of users who had registered on the software

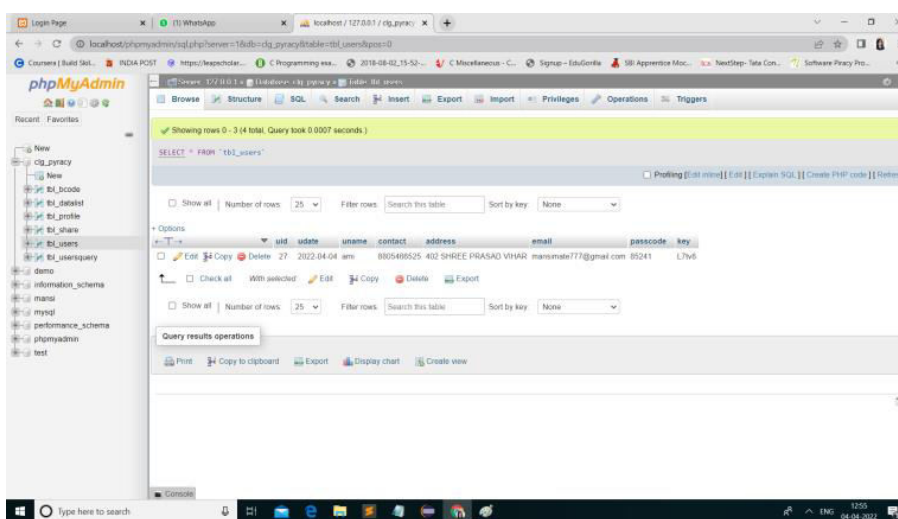


Fig 4.8: Database (list of users)

It shows the device id from which the user registered.

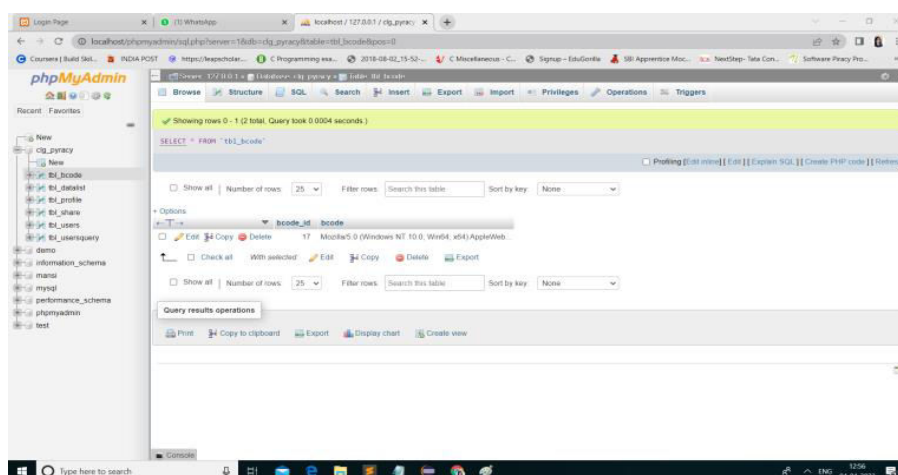


Fig 4.9: Database (list of device id)

12. FUTURE SCOPE

➤ Tamper-Proofing

A few computer programs have set of instructions that causes to occur the program to stop working when the source code is interrupted or changed.^[10]

Tamper-proofing halt users from accessing software by stealing the actual program code and prevent it from making changes or manipulate the original code^[5].

13. CONCLUSION

The paper are presented techniques involved Software Piracy Protection leading access the software from an authorized person only and block unauthorized access, this program provides additional security to the software, also it checks the software product key for accuracy with the corresponding MAC address of the system^[2].

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Sahara: An Android Based Donation App for Helping the Underprivileged

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ABSTRACT

As there are many non-governmental organisations (NGOs) in India, we might not have a clear understanding of them. There are a variety of NGO's that deal with senior citizens, children, women, and the environment, and several other NGO's that work for animals where volunteers are needed. SAHARA app will assist individuals in gathering information from all non-governmental organisations on a one platform depending on their work categories. This permits non-profit organizations to post their volunteer needs so that interested individuals can contact the organization directly. As we have noticed that many donors wish to give but seem unable to do so at the NGO's place, we have added Connector support, where an authorised connector will be likely to function as a linker pin between both the donor and the NGO. Appreciation performs a vital role in everyone's life, hence we've made the decision to provide appreciation certificates to all those who deserved this. People would be able to categorise NGO based on their activities using the app. People will be able to give anything to the respective NGO's, such as food, stationery, clothing, and shoes. Users will be able to look for non-profit groups to volunteer with.

Keyword: Donor, Connector or Linker, Non-government organisations and Volunteer.

INTRODUCTION

Sahara is the android app which will help NGO's to get donations from people. Through this Person will able to find NGO's near to his/her Location. App structure will be consist of 3 Sections which includes NGO, Donor and Connector/Linker. NGO and donor has to Create an account (Registration) in android app and has to fill all the necessary details. NGO will be further categorised based on their work like NGO for child, senior citizens ngo etc. If donor is not able to go in ngo then they can donate through connectors. Connectors/Linkers are the mid and authorised person between NGO and Donor which includes Community or institutional based rotaract club or other authorised person from ngo. By using our app the donor who want to donate any item they don't know where to donate to overcame these problem we have made these app while donation they don't think about where to donate how to donate they can simply download our app and register thereself as a donor and they can donate item According to their choice and most important thing in our app we have categories into section child, adult, senior citizens so donor can donate easily the item and ngo also receive item easily. After chosen the item will be collect by the receiver or connector and it will successfully donate to the specific NGO.

II. LITERATURE SURVEY

In 2020 research paper the author, Secedes maeil Mousavi Bart Bossinkb and this paper studies the initiation of a partnership between a corporation and a nongovernmental organization (NGO) for environmentally sustainable innovation, as well as its development over time cross-sector partnerships corporate-NGO partnerships innovation Environmental sustainability dynamic capabilities A direct or indirect continuous fit between the corporation and the NGO influences the lifeline of their partnership. A case study to understand how a corporate-NGO partnership for environmentally sustainable innovation initiates and develops ^[1]

Jorge Rodriguez Cristina Jimenez Publish a paper in 2018 which describes A qualitative nested case study, which involved an NGO-led project that undertook supplier development programs for poor suppliers in cooperation with several firms. Recommendations for practitioners and areas of future research are also provided. Socially sustainable supply chains Inter-organizational relationships Firm-NGO cooperation Inter-organizational fit. Despite advances made by donors in moving toward more political methods for facilitating development, these efforts remain hampered given there has been little shift in the aid chain away from a narrow conceptualization of civil society, and few examples of their ability to design more innovative. ^[2]

In 2018 research Paper authors Jennifer N. Brass, Wesley Long and hooper Allison Schnabel find the literature is framed around six overarching questions regarding: the nature of NGOs; their emergence and development; how they conduct their work; their impacts; how they relate to other actors; and how they contribute to the (re)production of cultural dynamics. Articles also focus disproportionately on the most populated and/or politically salient countries, and on the governance and health sectors. This interdisciplinary literature is dominated by case studies and has become more quantitative over the time. ^[3]

In 2020 research paper the author, Sarah Masefield, Alice Megan and Piran C. L. White and the problem was NGO-collected and produced data are most commonly perceived as a source of supporting evidence for HPSR and not as primary source data. However, these data can facilitate research in under-researched marginalized groups and in contexts that are hard to reach by academics such as conflict-affected areas. The use of NGO data use could enable relevant and timely research in the areas of programmed evaluation and health policy and advocacy to improve health and reduce health inequalities, especially in marginalized groups and developing countries.^[4]

In the research paper of author is Helen Delisted Published in 2019. It describes the several views on NGOs. As NGOs are contributing at all stages of the research cycle, fostering the relevance and effectiveness of the research, priority setting, and knowledge translation to action. NGOs in all aspects of health research in order to maximize the potential benefits of research. NGOs, moreover, can and should play an instrumental role in coalitions for global health research, such as the CGHRC. Donor, Receiver, Admin, And the contribution of society and institute and forum of all the Ngo and workers.^[5]

III. MOTIVATION

In Situation like covid where no one ready to go outside and able to donate materials, they can do through SAHARA App. Many time person wants' to go for donation but not able to go outside, situations like this app will help to them as well Person will able to know about NGO, what kind of help NGO needs like Clothes, Food, Volunteers etc.

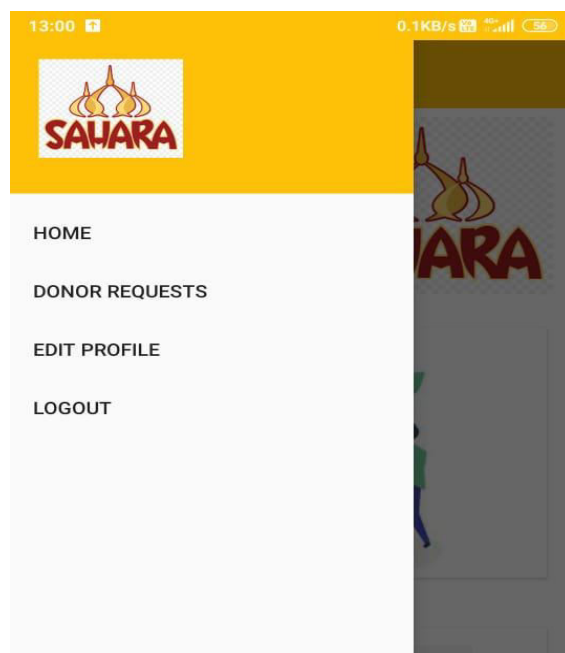
IV. OBJECTIVE

1. To display all the authorised NGO on one platform.
2. To show inputs of NGO based on their requirements.
3. To store data of donor, connector (linker) and NGO.

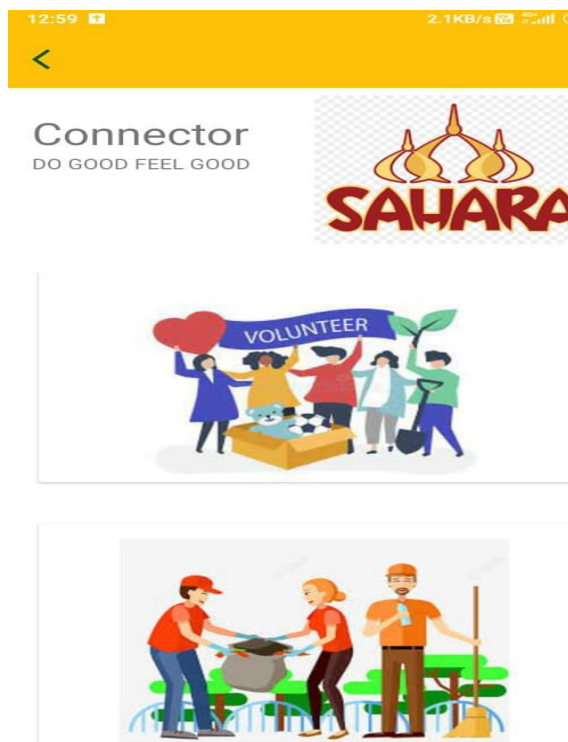
V. METHODOLOGY

In the last twenty years, the nonprofit sector has evolved far beyond charity work to encompass a myriad of organizations, coalitions, movements, and even businesses that serve a diversity of objectives and engage in many ways with public and private institutions. NGO ADVISOR monitors the international nonprofit community for ideas, practices, and models that challenge traditional approaches to the non-governmental organization, or NGO.

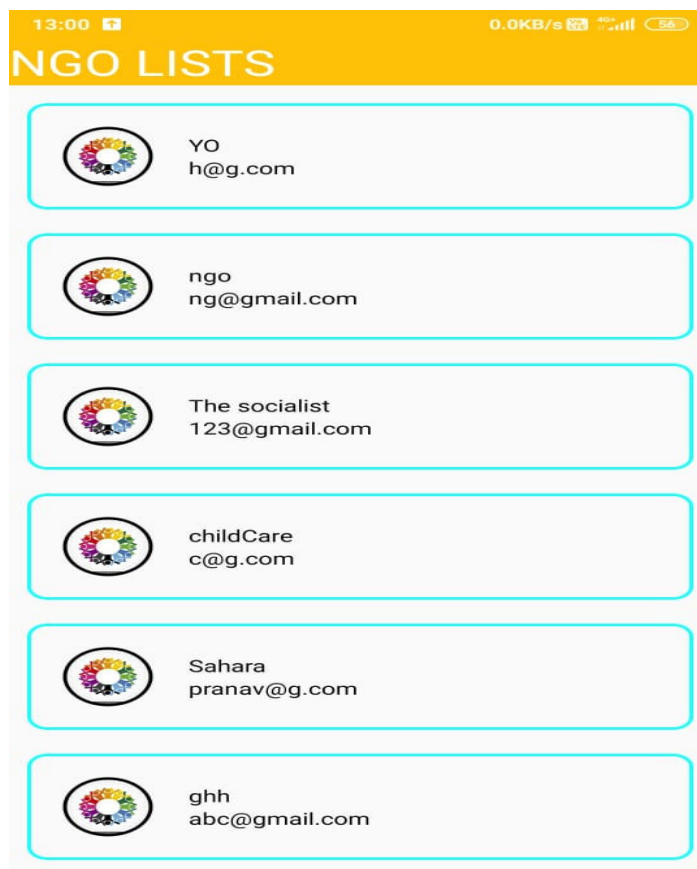
V. Implementation



Above figure (Fig A) represents home screen for user. User can login after registration. Once Person complete his/her registration he will notify through message about login credential, If Admin approves registration then only user will get his/her login credential otherwise not. Login credential will be shared to authorised person through normal text message.



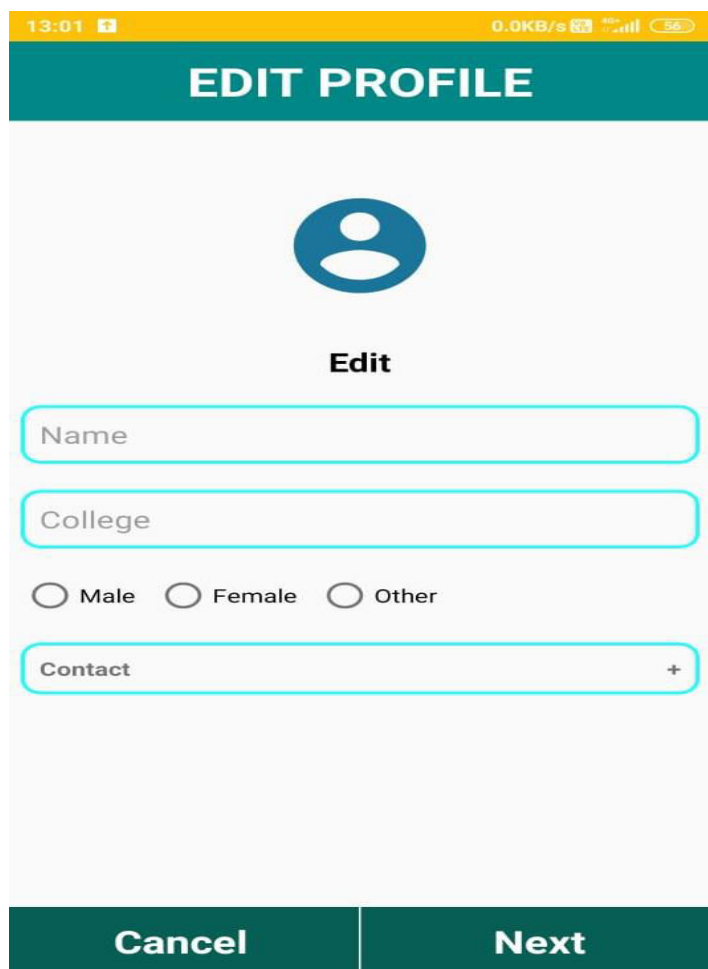
This is the login screen of user (Fig B). After getting login credential from Administrator Peron will be notified through message and after that he/she can send and accept request. Login screen will be same for Donor, NGO and Connector



As Shown in (Fig C) NGO list will be shown here. All the authorised NGO will be shown here through which person can connect for donation even they can chat with each other before donation.



Above figure (Fig D) represents home screen for Donor. If Person has logged as a donor then he/she will give this screen after login. Donor is the Person who wants to donate in NGO.



If Person suppose donor, connector or NGO has shifted their adrees and need to modigy it in app then they can take help of edit section as shown in fig.E through which peron will update their current data easily

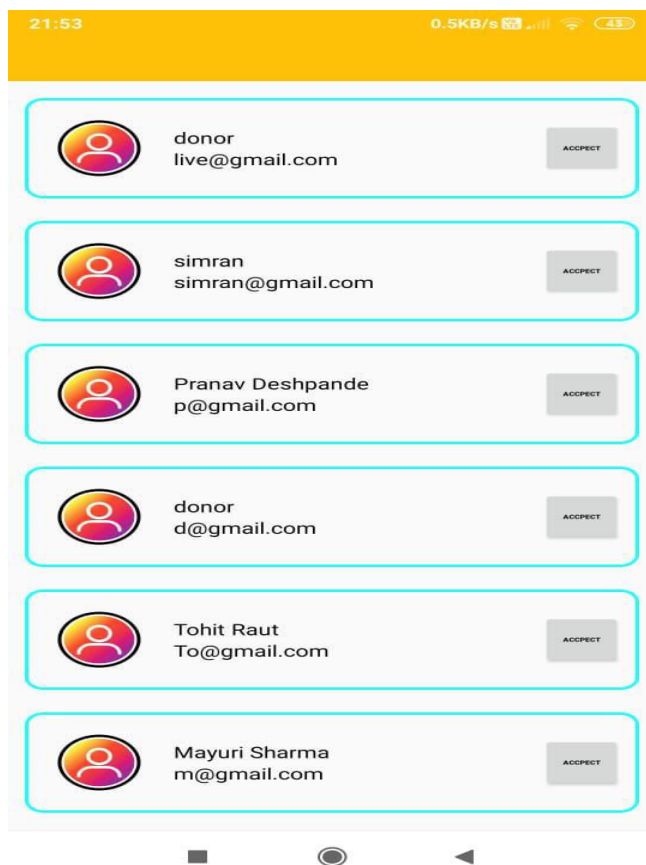


Fig F: Request for connector/linker

Connector is the third/mid person who is responsible for connecting donor and NGO. Connector will get request from donor (as shown in figure F)encase donor want to send donation through Connector, here connector can accept or denied request from donor based on their availability. Connector is the authorised person; authentication of connector is checked through admin.

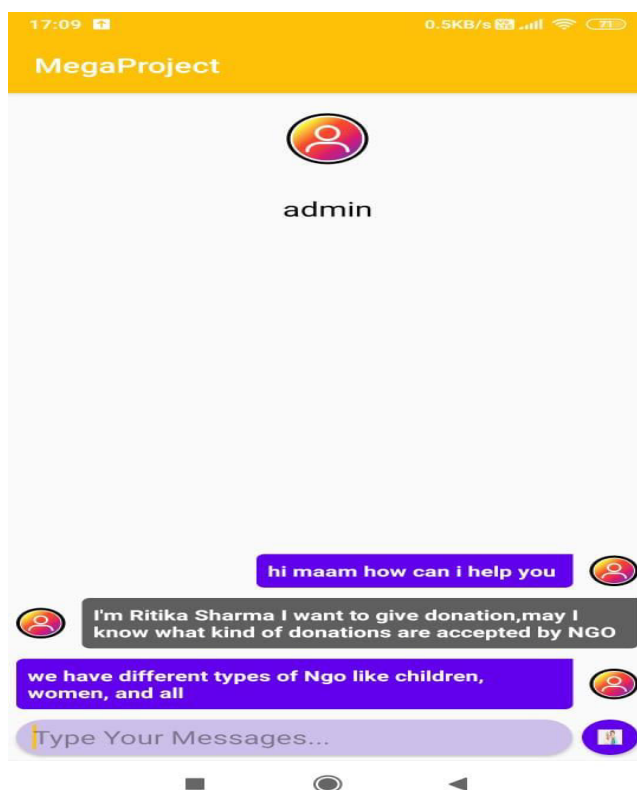


Fig G: Chat Window

Through chat window Person can connect each other on SAHARA app through this NGO can connect with Donor and Connector same with Donor and connector too. They can fix Particular time to get donation at specific place and it will also help to find out exact need of NGO.

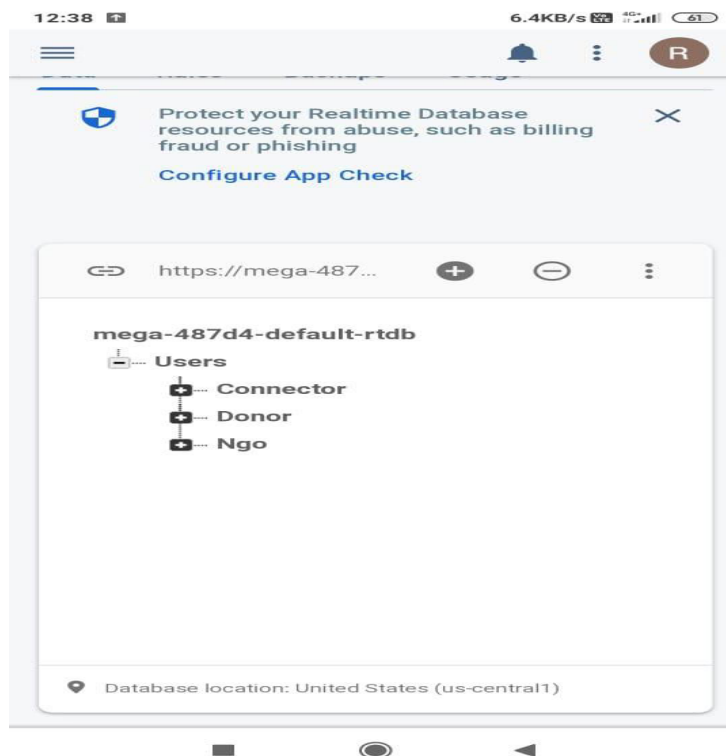


Fig H: Database of Donor, connector and NGO

Above Figure (Fig. F) represents database for Connector, Donor as well as NGO. We have used firebase to store data at the backed. As we have three main Part of this app i.e Donor, NGO and Connector, in the same way data will be formed in structed and seggregated way at the backend. This structed data will help to manage information of all users, donors and Connector on one platform.

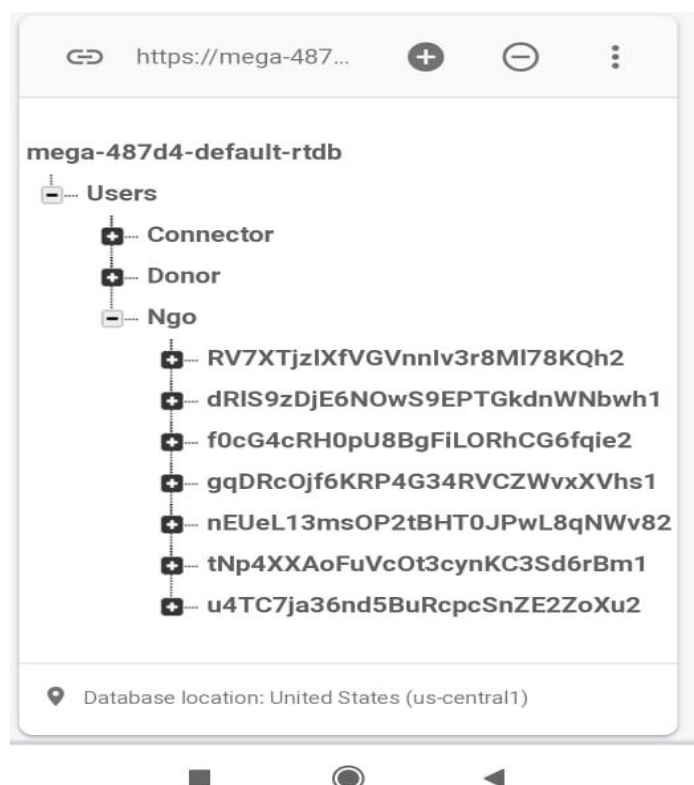


Fig I. Database of Registration for NGO

As shown in Fig H data will be stored in structured format and inside this data will be stored as shown in figure I , which will help admin to validate data and send login Credential to donor, connector and NGO. Authentication will be based on authorized id or Aadhar card of NGO or user/connector.

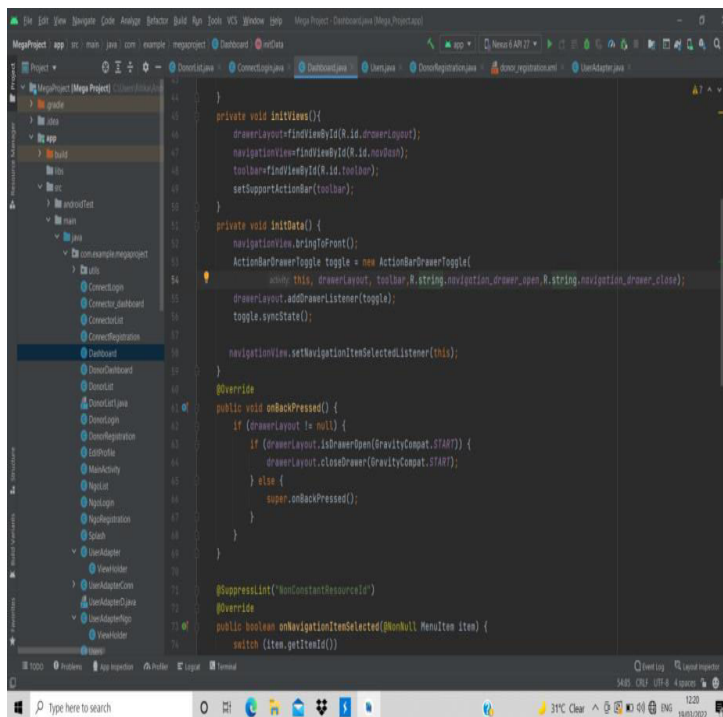


Fig J: Coding screen 1

We have use Java language to make this application “SAHARA” as shown in Figure J. Android studio is the platform to run programmes. Android tool provide fastest tools for building apps on every android device.

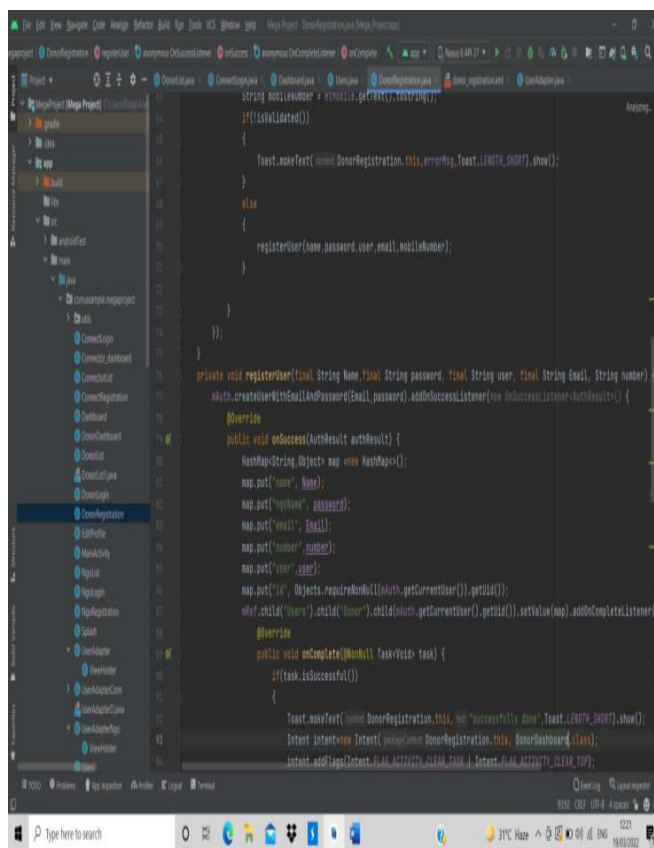


Fig K: Coding screen 2

We have use Java language to make this application “SAHARA” as shown in Figure J. Android studio is the platform to run programmes. Android tool provide fastest tools for building apps on every android device.

VI. RESULT AND DISCUSSION

Not getting food or needy things on time leads to situations like malnutrition, depression, mental issues etc. Through application, Ngo will get help from several donors’ they can able to share their requirement on one platform. It seems many times that children’s of orphan house, Women’s of NGO and senior citizens of old age house wants’ to learn new skills to enjoy their free time, through application we can get volunteer help to which will help to become more educated

VI. CONCLUSION

Through the Analysing data from Research paper, Through this we got an idea to how to design Our application in better way, research paper helps us to get clear and crystal idea about flow of application, It’s also help us to get clear idea sections also. Many of application which we have researched were web application which includes HTML, CSS, Bootstrap and JavaScript. By using this technologies application gets more styling.

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Milk Melamine Detection in Unmodified Gold Fractals

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ABSTRACT

Melamine is a tiny, nitrogen-rich polar molecule (67 percent by mass). It was recently discovered in milk and animal foods where it was potentially added to create a misleading impression of the high protein content. Melamine coupled with cyanuric acid is thought to induce deadly kidney stone because an insoluble melamine-cyanurate combination is formed. The surface enhanced Raman spectroscopy (SERS) shows easy detection of melamine in raw milk, employing fractals of bare and non-functional — oral 30 nm gold nanoparticles (AuNP) dispersed on a solid substrate. The method shows the development, following exposure to melamine, of AuNP fractals from a random distribution, which increase the Raman cross-section in enough for SERS to be detected. The agglomeration that is evident at increasing concentrations of melamine is shown immediately by imaging and by finite difference time (FDTD) calculations, the Red-shifting of the plasmon absorption peak of the AuNP fractal from 530 nm. The detection limit of 100 ppb could be replicated.

Keywords: Melamine; Fractals; Plasmonic nanoparticles; Finite difference time domain; surface-enhanced Raman spectroscopy

INTRODUCTION

The National Dairy Research Institute is a leading research institution devoted to supporting research and development and human resources (R&D) programmes in the country. Dairy products, due to their great nutritional content, are important components of a balanced diet for all age groups. Protein concentration in milk is essential in the manufacture of many products with substantial sensory and rheological impacts, and is thus employed by many sectors as a quality measure. Since nitrogen-rich compounds may imitate a high protein level, conventional techniques cannot differentiate between nitrogen and non-protein sources, which led to the widespread usage of these compounds in milk-based adulterations.

Milk is regarded a "perfect diet" by both babies and adults because of its rich nutrients. It is one of the finest protein, fat, carbohydrate, vitamin and mineral sources. Sadly, milk is contaminated quite readily all around the globe. The antimicrobial supply of vital amino acids, calcium, zinc, copper and phosphate ions is the milk protein, which has many bioactive peptides. Moreover, milk protein enables several nutrients to be absorbed. Milk is, nevertheless, one of the seven most frequent adulteration targets. The primary motive for adulteration is frequently to increase the amount, conceal poor quality and substitute genuine ingredients for the commercial benefit of the vendor. Adulterated milk is usually made by adding water, milk whey, sodium caustic, salt, sugar, urea and many other impurities.

Melamine is an organic molecule with 1, 3, 5-triazine and 2, 4, 6-triamine skeleton and the aqueous melamine solution is mildly alkaline (2,4, 6-triamino-1,3,5-triazine; C₃H₆N₆; weight: 126,12). Melamine is usually a core chemical used to produce a fire retardant, water-reducing substance and formaldehyde cleanser, for example. The excessive consumption of melamine is due to its biotoxicity, causing significant damage to human health and leading to sick renal and urinary systems. The fact that its high nitrogen concentration raises the apparent amount as assessed by conventional protein analyses, such as Kjeldahl or Dumas, is a driving factor for the adulteration of a food product with melamine. Products including milk, baby formula, frozen Yoghurt, pet food, biscuits, sweets and coffee beverages have been found to cause melamine contamination. Unfortunately, though, melamine may produce insoluble melamine cyanurate crystals in the kidneys, causing renal failure. The reason why melamine is added to milk so that it appears in protein to improve the milk price. The protein content of the milk is not explicitly assessed as cumulative parameter with Kjeldahl's measurement of the nitrogen component to prevent the addition of melamine. Thus it is essential to determine melamine and other tiny, high-nitrogen chemicals to guarantee food safety.

Consequently, melamine is not authorized as a food ingredient in animal feed or human food by governments. However, melamine was occasionally unethically added to protein-rich foods in order to boost the amount of nitrogen (66 percent nitrogen by mass). The protein content was frequently falsified in human and animal foods.

Excess and persistent melamine exposure was related with renal failure, kidney stones and associated mortality in children and animals. This worrisome scenario has led to an urgent requirement in food items, particularly in baby milk powder, for a constant monitoring of melamine levels.

Melamine is a widely-used intermediate, primarily utilised for the production of melamine resin and is a chemical found most often in plastic products. Long-term melamine consumption or mass ingestion may lead to reproductive harm or to bladder or kidney damage, which can also lead to bladder cancer. Melamine is very simple, fast and cheap to detect in milk, owing to a portable melamine detector that researchers have developed at Bangalore's Indian Institute of Science (IISc). Leaf extract, combined with silver nitrate, is used to identify the presence of melamine in milk. A simple, speedy and easy colorimetric sensing method is provided for melamine detection in milk samples using thymine derivative (NT-) decorated gold nanoparticles (AuNPs), which is based on the hydrogen bond between thymine and melamine.

Monitoring goods containing melamine continues to be a global issue. Melamine is a widely used industrial chemical in plastics and fertilisers. Since melamine is rich in nitrogen, it may increase protein value during standard testing if added to food. However, if the chemical is consumed, it may cause severe health issues and even death. We are showing how the target analyte, melamine, promotes agglomeration in unaltered gold nanoparticles, resulting in solid-air support fractals which allow SERS target detection. Using an optical simulation of the finite time differential (FDTD), we provide a preferred plasmon dispersion condition on the Aufractal substrate that is required for sensing.

LITERATURE REVIEW

Xiaoling Bao, Jianhong Liu, Qingshu Zheng, Lixin Duan, Yuzhu Zhang, Junlong Qian, Tao Tu (2021) The use of gold nanoparticles (AuNPs) stabilised by an unsymmetric terpyridyl zinc complex with thymine fragment at one end of the terminal and quaternary ammonium salt at the other was an easy color-metric method for visual detection of melamine in raw milk. Even without the presence of preaddition of melamine and relative additives, the naked eye showed obvious changes in colour, in the presence of trace amounts of melamine, which were caused by a selective binding of AuNPs between the thymine fragment and melamine through triple interaction of the hydrogen binding process. The detection limit for melamine was as low as 2,4 ppb and provided a highly sensitive and effective visual detection method for melamine.

Qian Li, Jiemin Zhao, Longfei Liu, Sagun Jonchhe, Felix J. Rizzuto, Shankar Mandal, Huawei He, Sansen Wei, Hanadi F. Sleiman, Hanbin Mao, Chengde Mao (2020) A binary pair of hydrogen-bonded motifs limits the variety of DNA duplex configurations. Here we demonstrate that poly(thymine) self-associates in the presence of melamine form anti-parallel, right-hand duplexes. A tiny molecule with a triple set of adenine-bound hydrogen. X-ray crystallography reveals that two poly(thymine) strands wrap around a helical column of melamine that bands thymine on two of its three sides with hydrogen. Thymine-melamine-thymine triplet's mechanical strength exceeds that of adenine-thymine base pairs, which permits a sensitive detection of melamine at 15 p.m. The poly(thymine)-melamine duplex is orthogonal to native DNA base and may be removed without overhanging. The integration of poly(thymine)-melamine duplex into two-dimensional grids and hybrid DNA polymers emphasises as another technique for the DNA nanotechnology.

Shehab Al Shehab, Riham El Kurdi, Digambara Patra (2020) Here we report the effective production of three distinct poly(ethylene glycol)-coated gold nanoparticles (MPEG thiol, PEG thiol and mPEG amine) by reducing Au³⁺ to Au⁰ with curcumin. In order to understand the size and form of nanoparticles and their impact on surface plasmon resonance (SPR) fluorescence and resonance Rayleigh scatter (RRS) signal was investigated the effect of stabilising agents (surfactants), pH and temperature. The mPEG thiol-coated AuNPs were used as an optical technique for melamine determination. The melamine-AuNP combination reduces the SPR signal and the fluorescence intensity of the AuNPs between 0 and 10 mM. With a detection limit of 33 nM, the technique is simple, inexpensive and quick.

Jing Wang, Xinyue Liu, Liang Huang, Jiening Jin, Chenxing Jiang, Daquan Li, Huimin Wen, Jun Hu. (2020) The method of ratiometric fluorescence is of considerable interest because of its visualisation. The development of a dependable fluorescent nanoprobe is greatly sought after, but is hampered by lack of stability and controllability. We present here a strong, dual-emissive nanohybrid nano-quantum dot with accurate colour tuning and show its potential as a two-signal ratiometric visual sensor. A new assembly method for hydrophobic green and red quantum dots (QDs) was developed onto a silica scaffold that forms a dual-emissive hierarchical silica-nano-hybrid. The nanohybrid fluorescence intensity ratio and colour were accurately adjusted by changing the quantity of green and red QDs. The nanohybrid has particularly well-maintained fluorescence

characteristics of the original QDs and strong optical/colloid stability after alkylsilane-mediated phase transition and outdoor silica coating development.

Quan Chen, Meifang Qie, Xusheng Peng, Yan Chen, Yulin Wang. (2020) A quantum-dot-bead-based immunochromatographic assay (QB-ICA) was developed for the detection of the hazardous chemical melamine (MEL). After optimisation, a linear range of 0.06 to 0.28 ng mL⁻¹ was calibrated with a detection limit (LOD) of 0.04 ng mL⁻¹. The LOD of the colloidal gold-based nanoparticles (LOD = 1.4 ng mL⁻¹) was 35 times below ICA, and 40 times below that of the quantum-based test (LOD = 1.6 ng mL⁻¹). The LOD of samples with a suggested pretreatment of MEL in pure milk using the proposed QB-ICA method (LOD = 0.19 ng mL⁻¹) was 18.4 times less than that of samples without pretreatment (LOD = 3.5 ng mL⁻¹).

MATERIAL AND METHODS

This part also includes more tests on the viability of the suggested technique for the detection of melamine in actual milk samples combined with melamine in various quantities. During the aforementioned process, milk samples with various amounts of melamine are produced. The 0.5 μM, 1.5 μM and 2.5 μM melamine solutions were agitated with a Vortex-Qilinbeier5 vibrator for 0.5 min. In fact, melamine solutions of 100 μL have been removed individually from above 0.5 μM, 1.5 μM and 2.5 μM and AuNPs have been added to the 5-fold dilution. The findings of this experiment indicate that there is still a linear response connection between the absorbance difference values of wavelength 520 nm and liquid milk concentrations of melamine in the 0.1 μM to 0.9 μM range. The estimated recovery rate for the colorimetric detection of melamine samples is shown in Table 1. With a recovery rate of 99.2 percent ~111 percent, the detection limit of 33 nM was achieved. This regeneration experiment demonstrates that the AuNPs colorimetric resonance of melamine in the liquid milk is also appropriate for fast melamine detection in practise.

Table 1: Comparison of the detection limits of the various methods in the colorimetric detection of melamine in milk.

Techniques	Detection limit
Colorimetric method based on AgNPs	2.32 μM
Colorimetric method based on Mb—mediated AuNPs	0.238 μM
Colorimetric method based on SAA—AgNPs	10.6 nM
Optical fiber -based localized surface plasmon resonance of AuNPs (this work)	33 nM

Preparation of AuNPs

The AuNPs utilised in the studies were produced using sodium citrate to reduce chloroauric acid. 1 mL (1 percent) of sodium citrate was quickly added to 0.01 percent of boiling aqueous solution HAuCl₄ (100 mL) and further refluxed for 15 min. The mixture was then refrigerated with distilled water and stirred constantly until its temperature recovered to room temperature. For future usage, the wine-red AuNPs solution was then kept at 4°C. According to the UV-visible spectrum measured from the AuNPs solution derived from this preparation, the maximum wavelength absorption of AuNPs is 520 nm. It can also be found that AuNP sizes were approximately 13 nm from the microscopic electron transmission (TEM) pictures.

Establishment of Detection Method

First, a 100 μL solution from AuNPs was obtained using a centrifugal tube (complete scale, 500 μL) and diluted with 300 μL ultrapure water. 100 μL melamine solutions (standard level) were then added into the AuNP solutions for sample solutions with various concentrations. These sample solutions were uniformly mixed with the Vortex-Qilinbeier 5 vibrator before being transferred individually to the cuvette. After 30 minutes of response time, the absorption spectrum was constantly measured every 15s, and 120 sets of spectrum data were completely saved. The calibration curve was then determined by the connection between the absorption at the maximal uptake wavelength of 520 nm and the melamine solution concentrations.

Melamine Contaminated Water and Milk Sample Extraction

Aqueous melamine solutions have been produced by adding estimated melamine quantities to the DI water to achieve desired concentrations. These solutions were utilised when distributed over an AuNP-coated silicone

surface to produce the AuNP fractal. Melamines with milk extracts was derived by combining calculated amounts of melamine with commercial liquid milk to achieve 10, 1, 0.1, and 0.01 ppm concentrations (Mc) and then using citric acid, separating the protein at 10000 revolutions per minute in an ultra-centric fuge and collecting the supernatant. For the collection of melamine-contaminated surnatant proteins and fat components are eliminated. This removes any impact of the content of milk on AuNPs.

Instrumentation

The AuNPs colloid optical pictures were obtained using a Canon 7d (Japan) camera coupled with a 17 to 50 mm, f 2.8, Sigma lens. The auNPs are evaluated using a microscope for electron transmission (TEM, JEM-2000EX II, JEOL Corp., Japan), and a high-resolution electron microscope for electron scanning (HRSEM, JEOL 5700F, Japan). A double beam spectrophotometer is used to detect the surface plasmon absorption peak of the AuNP solution using absorption spectroscopy (JASCO V-670, JASCO Corp., Japan). A Nanosizer (Zetasizer Nano ZS90, Malvern Instruments Ltd. UK) has been utilised to precisely determine the size distribution of the AuNP. The machine has a He-Ne laser of 4 mW (632.8 nm) and a temperature control unit of 0°C to 90°C. A commercial spectrum from Jobin Yvon LabRAM HR800 (HORIBA Ltd., Japan) coupled with an Olympus BX-41 microscope and CCD cooled liquid nitrate detector was used to acquire the Raman spectra. A 633nm laser arousal was utilised. The machine's spectral resolution was 0.6 cm⁻¹. Using a typical crystalline silicon wafer, 30 µL of the AuNP solution was distributed into the SERS substrate.

FDTD Simulation

Numerical FDTD simulations were conducted in order to establish the role played by the size of the AuNP and the interparticle spacing on the resultant plasmonic characteristics of the as-dispersed and melamine-induced agglomerated AuNPs (FDTD Lösungen, Version 7, Lumerical Solutions Inc., Canada). To imitate the distribution of AuNPs (before and after introduction of melamine), a model for the simulation with the FDTD was created by extracting (x; y) AuNP coordinates from a sample SEM top-view picture. The structure of the model mimics the Au cluster, the particle size and the spacing between the particles, and the picture import option is added to the optical simulation programme. The simulation settings are: 0.001 fs time step, 1 nm mesh (dx, dy and dz), 1.0 and 1.33 backdrop and a known gold index. All three orientations have been utilised for perfectly matched layer boundary conditions.

RESULT AND DISCUSSION

Detection of Melamine in Liquid Milk Samples

This part also includes more tests on the viability of the suggested technique for the detection of melamine in actual milk samples combined with melamine in various quantities. During the aforementioned process, milk samples with various amounts of melamine are produced. The 0.5 µM, 1.5 µM and 2.5 µM melamine solutions were agitated with a Vortex-Qilinbeier5 vibrator for 0.5 min. In fact, melamine solutions of 100 µL have been removed individually from above 0.5 µM, 1.5 µM and 2.5 µM and AuNPs have been added to the 5-fold dilution. The mixes were then collected 100 µL and their absorption spectrum was analysed using this LSPR fibre optic detection device. The findings of this experiment indicate that there is still a linear response connection between the absorbance difference values of wavelength 520 nm and liquid milk concentrations of melamine in the 0.1µM to 0.9 µM range. Table 2 shows the estimated recovery rate of the colorimetric sample detection based on the measuring findings. With a recovery rate of 99,2 percent ~111 percent, the detection limit of 33 nM was achieved. This regeneration experiment demonstrates that the AuNPs colorimetric colorimetric resonance of melamine in the liquid milk is also appropriate for fast melamine detection in practice.

Table 2: The obtained recovery rate from measurement results

Number of Measurement	Concentration of melamine (µM)		(% Recovery (n = 3))
	Spiked concentration	Detected concentration (Mean ¹ +RSD ²)	
1	0.1	0.111+1.91%	111
2	0.3	0.304+1.38%	101
3	0.5	0.496+0.56%	99.2

Morphological Characterization of AuNPs

SEM and TEM evaluated the morphological characteristics of the AuNPs and AuNPs/melamines and the findings are shown in Figure 1. Unlike the uniformly dispersed AUNPs (Figure 1) the AuNPs/melamine cluster was found in which the particles were aggregated and linked networks formed (Figure 1). Furthermore, the

TEM images in Figure 1 have verified the melamine-induced aggregation of AuNPs. The AuNPs are spherical in form for nanoparticles with a size of about 3–5 nm, while the aggregate AuNPs are approximately 50 nm, which is in keeping with the TEM finding. In general, noble metal or magnetic NPs are employed to colorimetric or Raman spectroscopic detection of melamine. In this instance, we also utilized AuNPs for the detection utilizing SERS without any burdensome functionality.

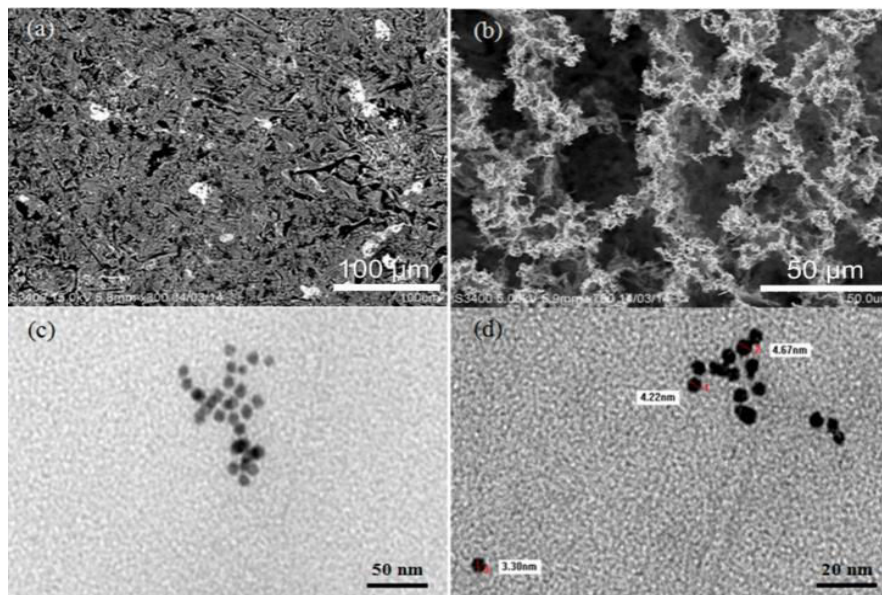


Figure 1: SEM of AuNPs (a), AuNPs/melamine (b), and TEM of AuNPs (c, d).

The Si substratum and the AuNPs that cover it have no chemical connection. Figure 2 includes SEM images of AuNPs before and after melamine treatment. The density of the as-dispersed AuNPs (dry), in Si air, was 300 30 NPs a μm^2 [Figure 2(a)]. In order to validate the distribution that mainly relied on the volume of the solution of AuNPs, and on the weaving characteristics of the cleaned Si HF surface, which exhibited a WAK angle of 43 deg at room temperature was reproduced [Figure 2(a), all panels] at various magnifiers and areas. Following the exposure to 10, 1 and 0,1 ppm of melamine, Figures 2(b) to 2(d) revealed the distribution of AuNP. These AuNPs easily form an interconnected fractal network³² when melamine is added, leaving polygonal islands between fewer than 20 NP per μm^2 . Such fractal structures have previously been established via the construction of a chain aggregate by the sharing of polygon faces, corners and edges. These borders, corners or sides are the regions we anticipate to improve SERS and are excellent for the sensing of melamine, which we would shortly prove. The peripheries of these islands are between 400 and 600 nm thick with linked and contained agglomerated AuNPs with a high 2-D spatial density nearing optimum SERS improvement³⁵ of $d^{1/4} / 2r$ where d is the spacing of interparticle and r is the radius of AuNPs. In other words, the effectiveness of SERS is marked when AuNPs almost contact one other. The auNP agglomeration has been evident for Mc 1/4 10 ppm, but the clustering is weakened, and the broken continuity of the fractal network is decreased when the island borders are lowered to 0.1 ppm at all, with the [Figure 2(d)] decreasing to 0.01 nm. In contrast the chain of AuNPs on the island borders was as thick as ~600 [Figure 2(b)] and as thick as [Figure 2(c)] when 10 and 1 ppm melamine were added, respectively.

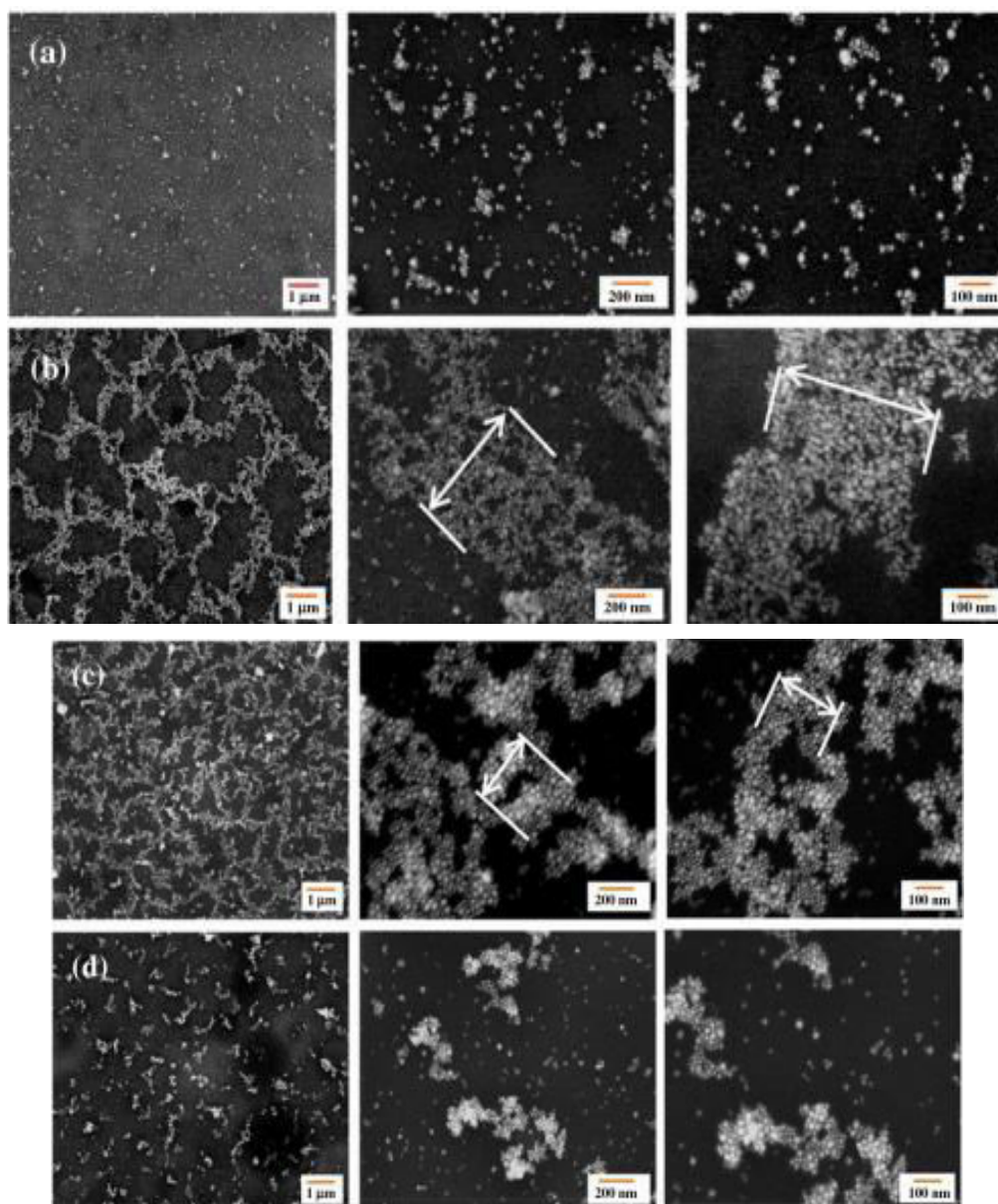


Figure 2: Representative SEM images of (a) as-grown AuNPs, and the fractal-like AuNP clustering, on silicon, post melamine exposure of (b) 10, (c) 1, (d) 0.1 ppm.

The density of the AuNPs was quantified manually, using 1 μm^2 mesh for 10 large SEMs and ignoring meshes with less than 300 30 NPs per μm^2 (as-dispersed density), with exposures of Mc 1/4 10, 1, and 0.1 ppm respectively, 2100 100, 1450 80, and 900 50 μm^2 . We discovered relatively few 3-D clusters in the great number of SEM pictures examined, which is not excluded, but most melamine-induced agglomerations resulted in 2-D clusters under the circumstances of experiments. Figure 3(a) to 3(d) contains comprehensive melamine SERS data distributed (Mc 1/4 10, 5, 1 and 0.5 ppm) over Si-coated AuNPs.

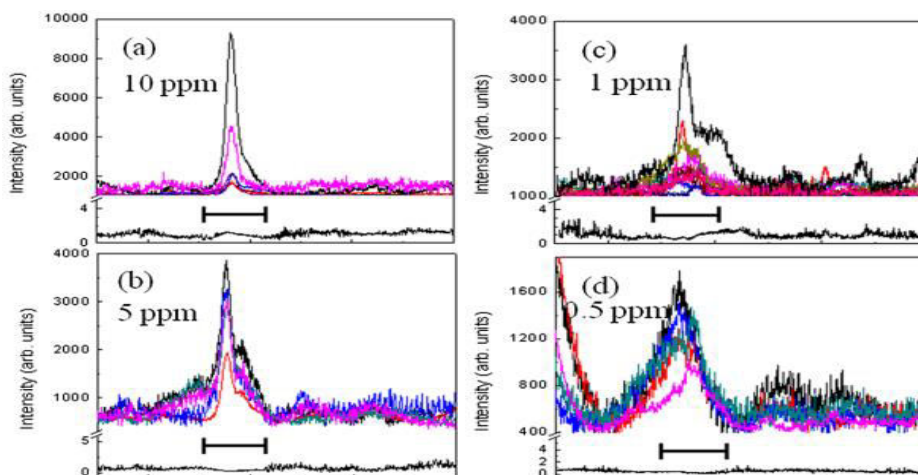


Fig. 3: Surface-enhanced Raman spectra (SERS), collected at 5 different spots of the same AuNP fractals, of melamine with (a) 10, (b) 5, (c) 1, (d) 0.5

Spectra were collected on each substratum at various locations with an emphasis on the characteristic melamine (bulk) peak at 676 cm^{-1} (Figure 4). For each concentration of melamine repeated scans and their relative standard deviations (rsd) are presented.

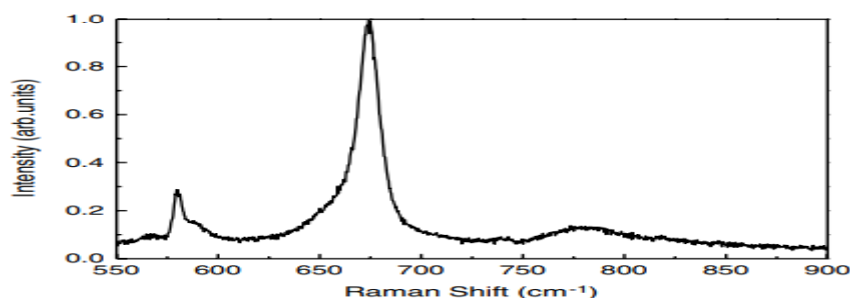


Fig. 4: Normalized Raman scattering data of melamine (bulk) powder, dispersed on Si, showing the signature peak at 676 cm^{-1}

Figure 5 shows the variance in the average I_{676} as Mc function for both SERS (in AuNP fractals) and non-SERS (in bare silicon reference plot) situations. The slope of this curve (Figure 5) indicates the detection sensitivity in the concentration range examined. It should be noted that the integrated signal intensity I_{676} is not only based on Mc, but also on the number of SERS active sites (N_s) in the lighted area (total $12.5\text{ }\mu\text{m}^2$). It is possible to write $I_{676} \sim \text{total } N_s \sim \text{total } Mc$ with certain simplifying assumptions. It should be noted that not all AuNPs are active SERS. 36 Given the growing coverage (area), we anticipate N_s to rise, and thus a greater I_{676} was seen [Figure 3(a)].

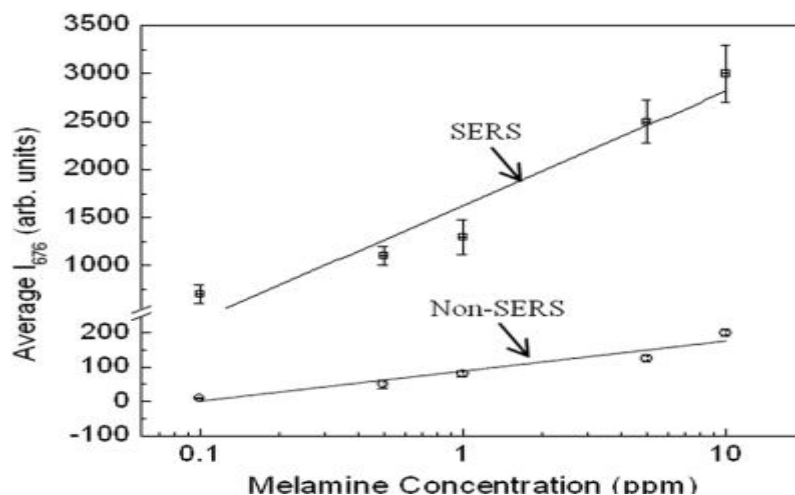


Fig. 5: Variation of the average intensity of the 676 cm^{-1} line of melamine Raman spectrum as a function of melamine concentration

Indeed, when comparing single, metallic particles and aggregates in single SERS molecules, Doering and Nie,³⁷ found that the most probable active sites or hot spots were at the intersection of two single particles in metallic aggregates. This is why the AuNP fractals contributed to the detection. The SERS enhancement factor (EF $\frac{1}{4} \frac{I_{SERS}}{I_{RS}}$ – the Raman dispersion cross-section) is difficult to determine, since the number of melamine molecules and Ns in the excited field and the $\frac{1}{4} \frac{I_{SERS}}{I_{RS}}$ value is unknown. A approximate estimate of the EF may still be obtained using the following equation with some approximation.

$$EF = \frac{I_{SERS}}{I_{RS}} \times \frac{N_{bulk}}{N_{ads}}$$

Where the I_{SERS} and I_{RS} indicate the signal intensity, in the presence of the AuNP fractals and in the bare silicone of a specific Raman mode of the analyte (676 cm^{-1}). N_{bulk} and N_{ads} indicate the number of bulk powders on bare silicone in the light-filled volume measured by Raman and absorbed by the AuNP fractals at various concentrations accordingly. The intensity ratio computation ($\frac{I_{SERS}}{I_{RS}}$) is easy from the Raman measurement. The bulk may be computed on the basis of density of bulk melamine (1.58 gm per ccm^3) and light volume (zone of laser beam \times depth of signal collecting). The signal collecting depth was estimated here to be 0.1 mm for laser 633 nm with melamine powder, and $\beta 12.5 \mu m^2$ for laser beam. N_{ads} are difficult to calculate and need simpler assumptions. From the specified concentration of the melamine in the 30 μL water volume used to disperse the analyte into AuNP fractals, it is feasible to determine the number of melamine molecules per unit size provided that the substrate is dispersed completely and uniformly. The EFs were estimated as 4.9 to 104, 8.5 to 104, 2 to 105, 3.2 to 105, and 1.4 to 106 for the AuNP fractals with Mc $\frac{1}{4}$ 10, 5.5, 0.5 and 0.1 ppm, respectively, under such assumptions and approximations. If we believe the SERS signals are from AuNPs alone, rather than silicon adsorbed melamine, the above-mentioned EF will only rise after decreasing N_{ads} on the AuNPs.

In order to understand why melamine detection was feasible, FDTD simulations (Fig. 6 and 7) were carried out even without the AuNPs' functioning. The FDTD findings are shown with a typical SEM picture of a particular AuNP distribution. Theoretically, a replica in size and density of a portion of this AuNP distribution is built. The AuNP distribution model may be computed for the optical extinction spectrum when input into the FDTD programme. The surface plasmon absorption peaks of the AuNP distribution will be shown at certain wavelengths. A single peak is produced in orthogonal polarsis directions (x, y) of the electric field (E) of the incident light for each unglomerated AuNP and two or more summits for the agglomerated AuNP. The programme will next scan the copy of the previously built AuNP distribution, with the light wavelength incident, resonant with the surface plasmon absorption peaks in each extinction spectra. This would lead to the E-field mapping of the complete AuNP distribution for surface plasmon. This process is performed in both directions of polarisation (x, y), with either one or two wavelengths computed based on the corresponding surface absorption peaks. The e-field mapping of the AuNP distribution was also carried out with an incident wavelength of 633 nm utilized for measuring Raman.

Figures 6 and 7 show comparative AuNP distribution FDTD optical simulations utilised for the detection of melamine. SEM picture (x;y) of heavily agglomerated AuNPs (Mc $\frac{1}{4}$ 10 ppm).

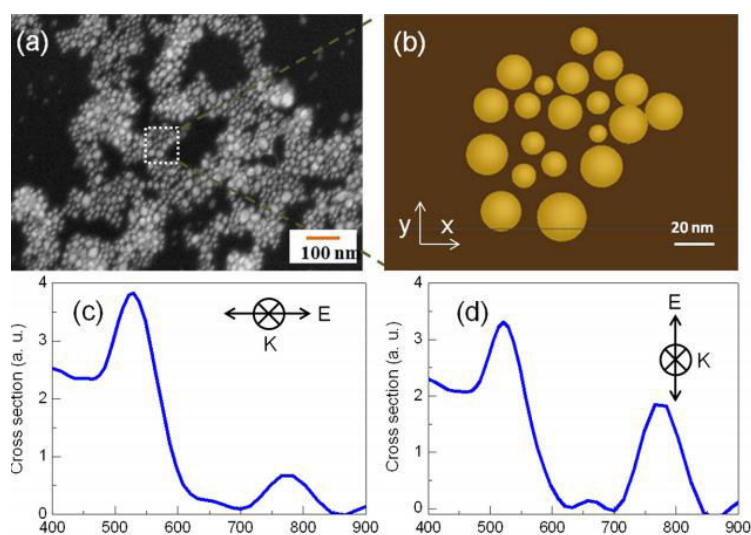


Fig. 7: Numerical simulations using FDTD of the AuNP distribution post 0.1 ppm melamine exposure assuming surrounding medium index of 1.0. (a) Representative SEM image of the AuNP distribution. (b) A model replica of the AuNP distribution, from a selected area of the SEM, for use in the FDTD software. Calculated extinction spectra of the model AuNP distribution [as shown in (b)] with (c) horizontal and (d) vertical incident electric field

The accurate theoretical [figure 6(a)] replica was created by utilizing the two perpendicular polarizations (Ex and Ey) of the electro-light field [figure 6(c) and 6(d)] that propagated in the z-direction to produce the extinction spectrum (scattering cross-section). There were dual peaks of the extinction spectrum at 525 and 770 nm (agglomerated AuNP plasmon surface) [Figures 6(c) and 6 (d)].

CONCLUSION

Recent product recalls and instances of food safety caused by melamine adulteration or contamination have created global food safety concerns. This has led to a number of techniques for detecting melamine in food, but few methods have been found to test melamine quickly and accurately in environmental samples. The presence of melamine was identified in raw milk by utilising silicone substrates with unaltered 30 nm AuNPs with surface enhanced Raman scattering. A total of AuNPs with an as-dissipated density of 300 AuNPs per μm^2 were observed to agglomerate melamine to mainly 2-D clusters with densities of ~ 2100 AuNPs per μm^2 (10 ppm) to produce a powerful plasmonic field under illumination. FDTD simulates the absorption and the plasmon field strength of the agglomerated AuNPs. Optical simulations allowed to qualitatively predict the distribution of plasmons to allow the detection of melamines to a limit of 100 ppb. When applied to these unmodified auNPs, the melamine containing milk extracts produced robust Raman signals at 676 cm^{-1} confirming the presence of melamine.

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Online Auction System

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ABSTRACT

The ever-increasing growth of online auctions highlights the need to research the online auction system and build a theoretical research framework based on successful business models. Although traditional auctions have well-founded theoretical and empirical research foundations, our current understanding of online auctions is relatively limited. A comprehensive conceptual model was developed that could serve as the basis for future online auction research. Discovering the potential pre-success of online auctions, presenting a review of existing research, as well as systematic theory and dynamic analysis. Inputs, processes, and output features will be discussed in chronological order building a conceptual model. The conceptual model serves as the basis for future research at online auctions, using a contemporary culture and lays the foundation for the development and evaluation of research ideas that will push the boundaries of knowledge in the field.

Keywords: E –Auction, Web Communication, Application-level protocols, Information Security.

INTRODUCTION

A few decades later, auctions were held in auction houses, and bids were taken with the auctioneer present, which had a number of disadvantages. As a result, online auctioning was created, which enabled auctions to be performed by delegating bids. This strategy necessitated the use of a personal internet connection from anywhere on the planet. The emergence of online auctions has its own set of difficulties due to a lack of appropriate product and seller assessment procedures. The current methods do not allow for a detailed description of the different sorts of vendors and the items they offer. These methods do not provide you with sufficient information to evaluate the various sorts of merchants and their items. As a consequence of the scepticism of buyers, the efficacy of internet sales has decreased.

An online e auction system is a system that allows users to purchase, sell, and engage in the bidding process of items via the internet. It is a system that provides clients with ease while also bringing considerable value to the global e-commerce industry.

The provision of services for the worldwide growth of e-commerce via online services is provided by the trade of products. As a result, the dealer-to-consumer connection and trade, also known as business-to-consumer commerce, is growing. E auctions also save money and safe to use. It is popular among users since it allows people to purchase and sell things as well as set up bidding procedures without having to leave their homes.

LITERATURE SURVEY

In a research report released in 2021, Darpan Anand suggested their E-Auction method. Their study paper delves into the concept of E-Auction, an increasingly popular method of online procurement. A delivery policy has been established. This is a completely dynamic system that users may operate with ease. This study investigates the many methods of online procurement that are becoming increasingly popular. The popularity of the online e auction system is expanding due to its ease of use.^[1]

In another article titled 'Implementation of Internet Auction System' published in 2021, Amrita Shirode and her colleagues suggested that online auctions have effectively formed a vast virtual marketplace where anybody may buy, sell, swap, and examine the day's products. This project "Online Auction System" was designed to computerise the auction process, i.e., selling and purchasing things, using HTML, CSS, and Bootstrap on the front end and Python and SQLite database on the back end. The main benefit of using online auction platforms to buy a house is that you may make offers at any time of day, and there are no geographical, region, or other limitations.^[2]

Venkatesh Panchapagesan and Madalasa Venkataraman released their Working Paper No. 596 in August 2019 titled "Effectiveness of E-Auction Programs in Emerging Economics." The dangers of various auction formats have been thoroughly established in the literature. Milgrom and Weber (1982)²⁶ and Quan (1994)²⁷ claim that in the English Auction, where bidders are acquainted to one another, information sharing and collaboration among bids is particularly common (open bidding). Recurring bidding with the same set of bidders is extremely collusive since the cost of penalty against noncompliant bidders is minimal (Cramton et al, 2000). Seow et al (2005)²⁸ explore the effect of bidder turnout on auction pricing. Auction systems are more price efficient when there are more bids.^[3]

Jurjees Ahamed, in combination with their other members, offered their approach on E-Auction in 2018. In this article, they describe their experiences in developing an online auction system. Much of the existing auction software documentation was out of date and useless to researchers. Furthermore, the vast majority of existing concepts failed to adhere to fundamental UML principles. They designed a simple and clear online auction system based on UML. They presented an analysis and design for the auction system, illustrating key system components with UML diagrams. DealDaddy was being utilised to aid them in their study on real-time skill bidding detection. They were able to complete a variety of deals thanks to DealDaddy. They presented an analysis and design for the auction system, illustrating key system components with UML diagrams. ^[4]

OBJECTIVE

1. Online auctions have a wider reach of participations.
2. Can save time and travelling cost and money and reduces manpower. And users can participate from the comfort of home.
3. Online auction provides stress free accessible environment.
4. User can view product description to ensure accuracy.

PROPOSED METHOD

In the proposed system user will need to sign up for their product to be auctioned. He can create auction through the website in their system and. The admin member can appoint moderators who will help the owner in managing the user and vendors. The system also recommends a development system.

The system after careful analysis has been identified to be presented with the following modules and roles. The modules involved are:

1. Administrator

2. User
3. Vendor

1. Administrator

This website's super user is the administrator. No one have access into this admin page. The administrator has access to all information about all users and vendors. The administrator will have the access to the history of user, auctioned they won, the vendor's details etc. they also will have to approve the auction which will be scheduled by vendors. The administrator will be able to remove user, product, cancel auction, remove vendor.

2. User

This feature used by the user to login into system. A user must login with his user's name and password to the system after registration. If their login is invalid, the user will not be allowed to enter the system. After login they will be directed to the home screen of the system where they will be able to watch the scheduled auction, product which will be auctioned, product details, how much old the product is and the most important thing why the product is being auctioned what is its importance etc.

FUNCTIONAL REQUIREMENT

- The user can change their password after successfully logging in to the system.
- Password should be hidden from others while typing it in the field.

3. Vendor

This feature will be used by the vendor for the auction from different areas of the country. A vendor must login with his registered login details and passwords to the system after registration. If their login is invalid, the vendor will not be allowed to enter the system. After successful login the vendor will be able to schedule the auction on their desired time and date. They will be able to add the images of the product to be auctioned the product's description which is the most important criteria they have to follow for getting approval from the administrator.

IMPLEMENTATION

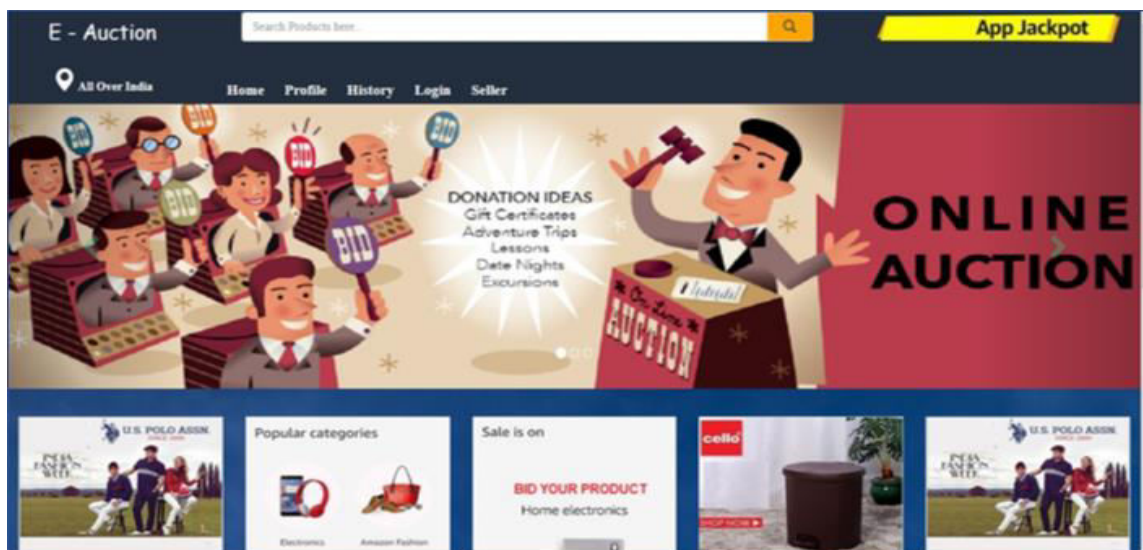


Fig 1: Home Screen



Fig 2: User Sign up Page

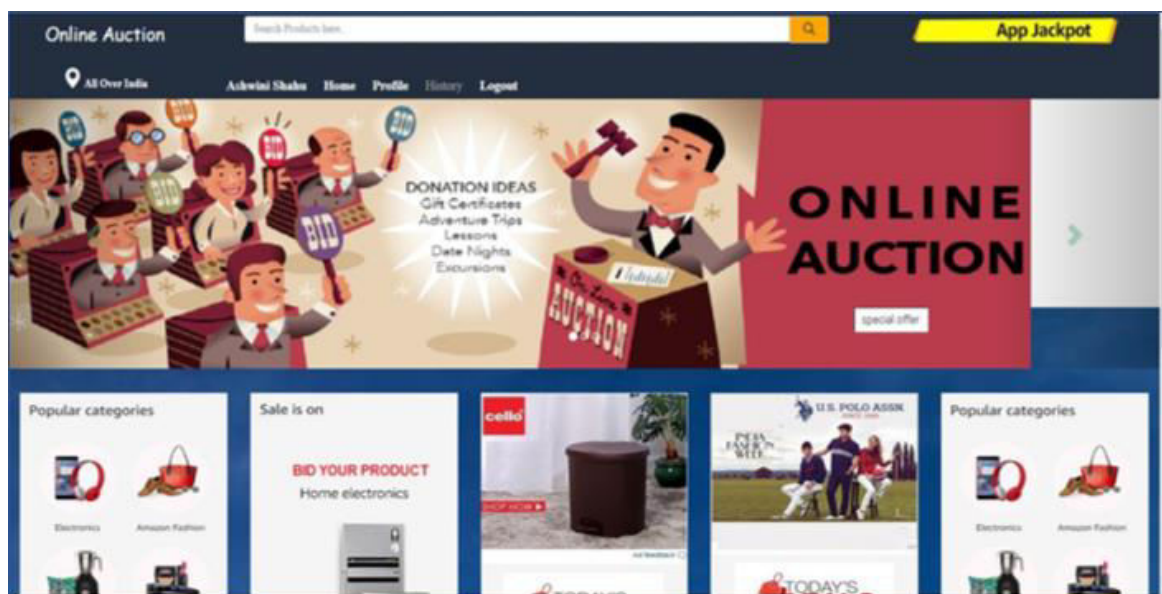


Fig 3: User Home Page

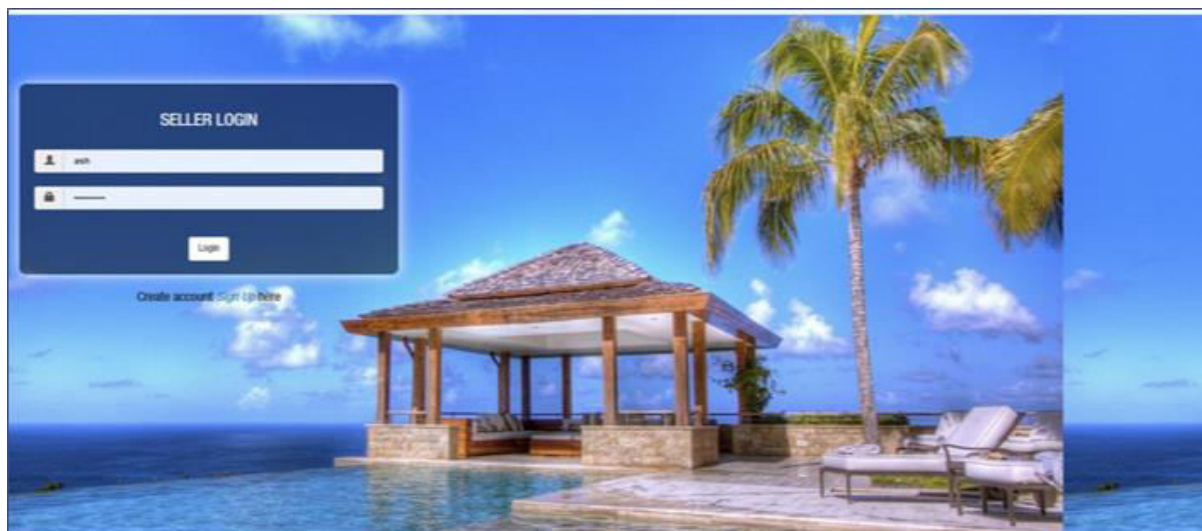


Fig 4: Vendor Login Window

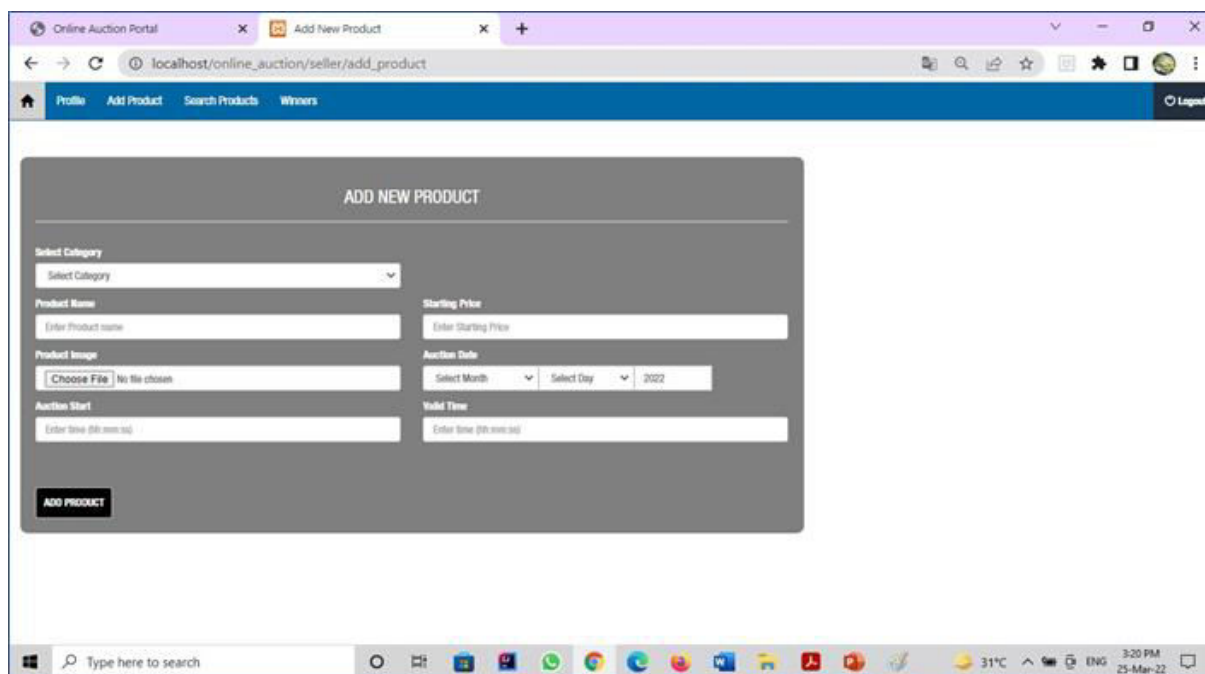


Fig 5: Add New Product

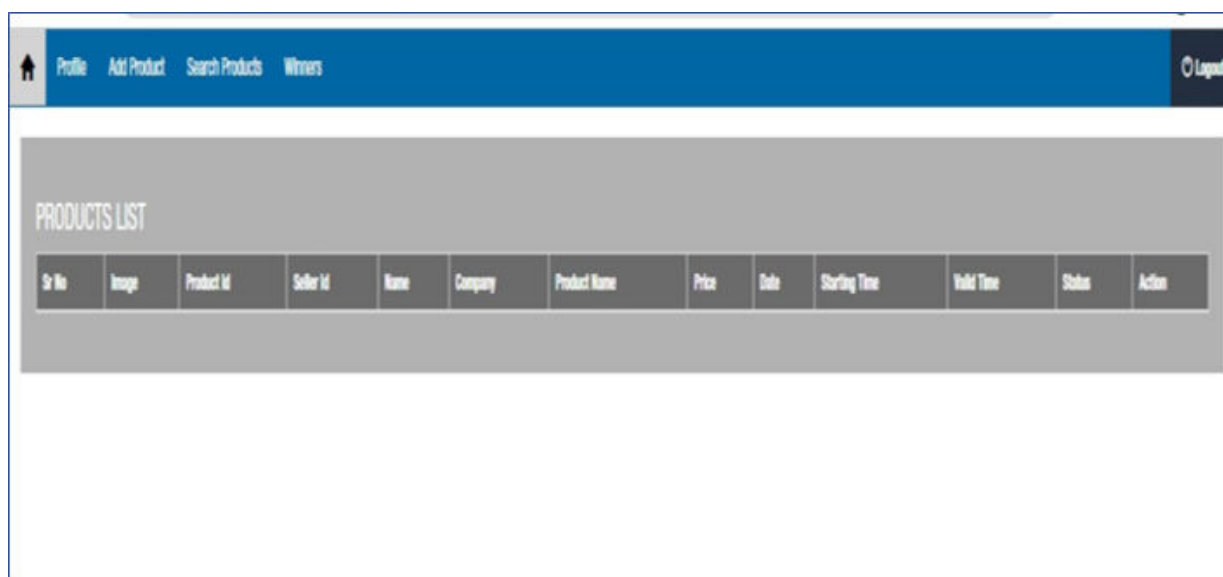


Fig 6: Vendor's Product List



Sr No	Seller Id	Product Id	Product Name	User Id	User Name	Auction Price
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Fig 7: Winner's List



Fig 8: Admin Login Window

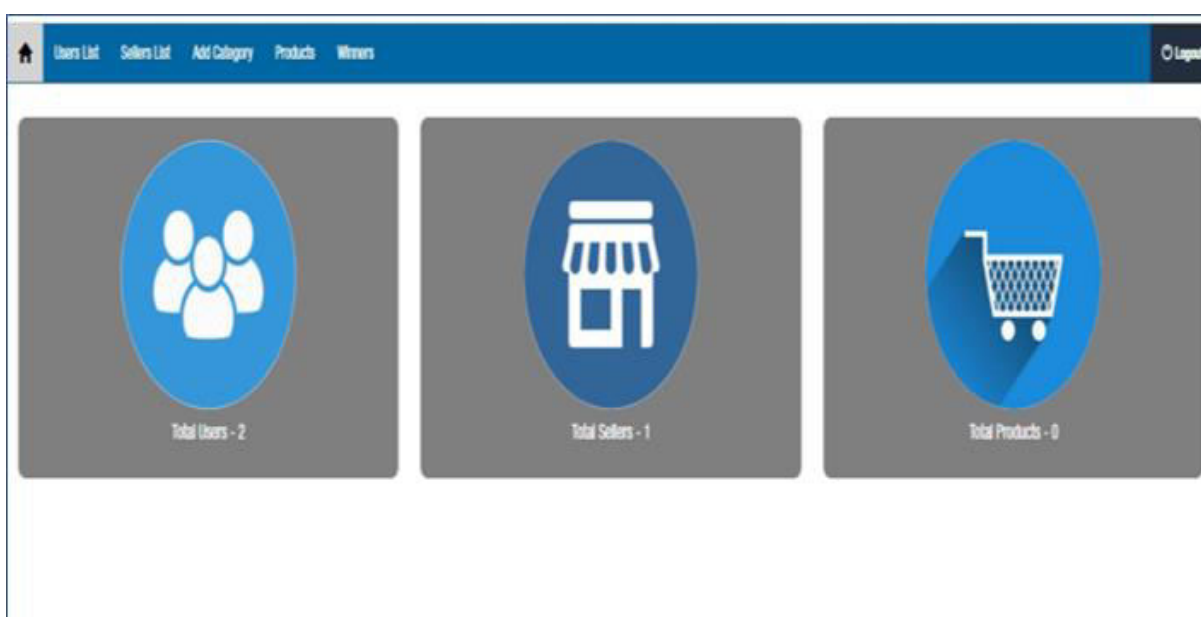


Fig 9: Admin Home Window

Sr No	User Id	Name	Contact	Company	Address	City	M Proof	Username	Password	Action
1	2	Admin Staff	978833481	S Company	KudaGwariRajpur	Nagpur	Yes	Ash	Pash@1234	DELETE

Fig 10: Vendor's List

Sr No	Image	Product Id	Seller Id	Name	Company	Product Name	Price	Date	Starting Time	Valid Time	Status	Action
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Fig 11: List of all auction products

Sr No	Seller Id	Product Id	Product Name	User Id	User Name	Auction Price
1	1	14	Wifi Module	2	Admin	140
2	1	16	New Furniture	2	Laxmi	2100
3	1	17	M Tv	2	Harshad	700

Fig 12: Winners of all auctions Window

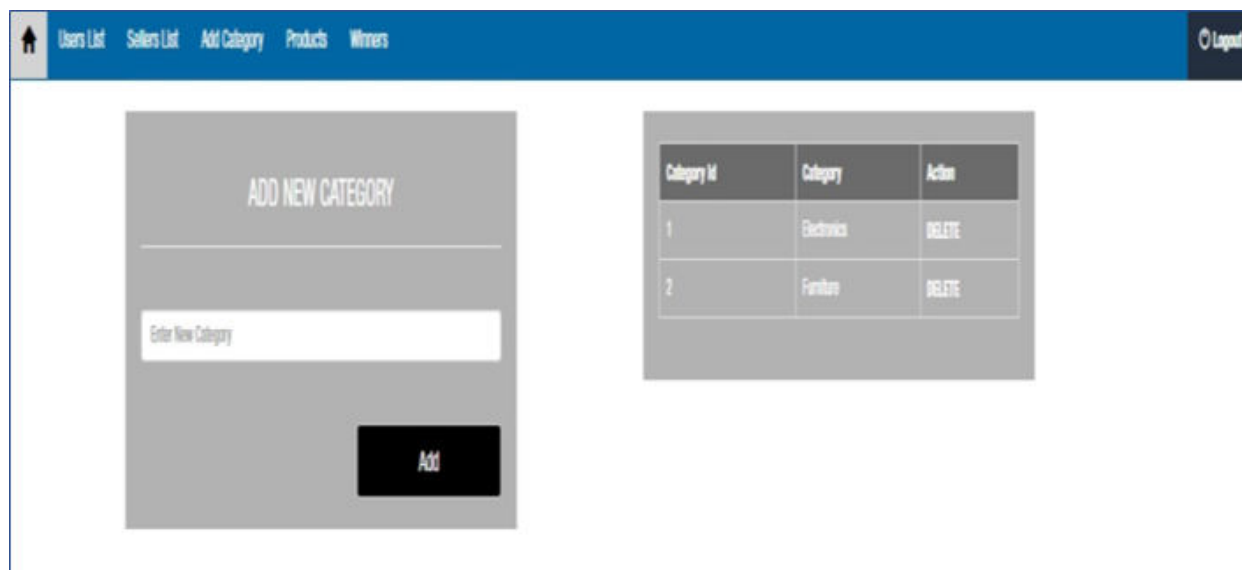


Fig 13: Add new category of product

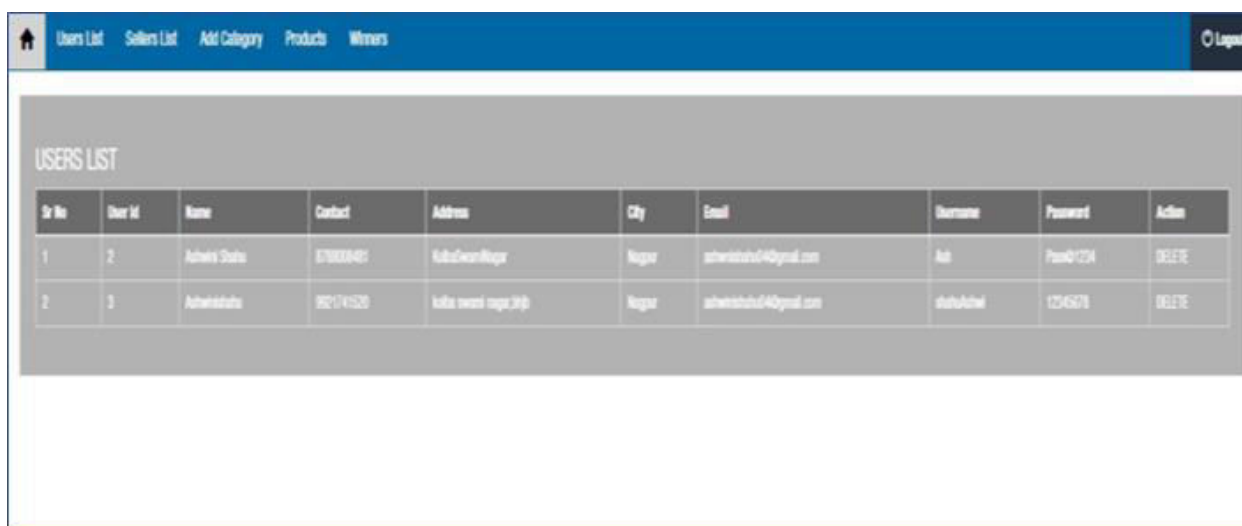


Fig 14: All Users' List

CONCLUSION

This paper discusses our experience in designing and organizing E – Auction system using machine learning technologies. The system provided by us follows better way of participating in auctions with valid time usage for bids and in descriptive manner of the product to be auctioned. This system provide better and wider reach of participants, can work effectively as this can be accessed from anywhere and anytime. This system will also provide notification system in their future scope so that no one will miss the auction in which they want to participate.

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Melamine Colorimetric Determination Utilising Unaltered Silver Nanoparticles in Milk

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ABSTRACT

Melamine (C₃H₆N₆) is a commercially synthesized chemical substance that is unlawfully added to milk to enhance the perceived protein content during processing. Melamine cannot be metabolized by the body and form insoluble crystals that cause damage to tissue and malfunction of the renal system. A fast and accurate technique for melamine testing is thus necessary. For the determination of milk melamine a colorimetric technique based on silver nanoparticles was devised. Without a stabiliser, silver nanoparticles were produced using sodium borohydrate as the reduction agent. We describe in this work a simple and sensitive colorimetric technique to detect melamine in milk based on silver nanoparticles. This technique is based on the premise that the aggregation of silver nanoparticles by melamine results in a sudden shift of colour from yellow to red under optimum circumstances. The melamine content may be quantitated in the contaminated sample using an ultraviolet-visible (UV-Vis) spectrometer to examine the absorption spectrum of silver nanoparticles. The current colorimetric technique, using 35 nm silver nanoparticles, is capable of accurately detecting melamine up to 0.04 mg l⁻¹ concentration.

Keywords: Silver nanoparticles (Ag NPs), Melamine, Milk, Adulteration, Aggregation

INTRODUCTION

Recently, food safety has become a significant problem since food illness has increased. For example, unlawful adulteration in milk products of hazardous substances, such as clenbuterol in meat and melamine, leads to food poisoning and serious health issues. In this light, melamine was a known addition with a nitrogen concentration of 66 percent, and is still used in the manufacture of a large number of plastics, adhesives, adhesives, engraved products, plywood's, cements, cleaners and retardant paints. Due of its low toxicity, it has been consumed unlawfully in many dairy products, leading to numerous health issues. Although melamine is low-toxic, it may induce kidney disease and death of babies at high concentrations. Furthermore, melamine may also be hydrolyzed into cyanuric acid in vitro, which forms an insoluble compound of melamine cyanurates and causes kidney stone development and blocking renal failure. Several instances of food poisoning have signaled the necessity for control over illicit melamine usage.

Melamine (C₃H₆N₆) is an organic compound that is widely used in manufacturing amino resins and plastics, melamine foam, glues, flame retardants, nitrogen fertilizers, etc. This extremely acidulous substance (66 percent nitrogen) is unlawfully added as a non-protein source of nitrogen to milk, baby formula and animal feed to enhance the apparent protein content. Standard tests for the estimation of protein in food such as Kjeldahl and Dumas cannot differentiate between nitrogen in protein and non-protein sources such as melamine. The addition of 1% melamine in food increases the artificial protein content by >4%. While metabolism of melamine has a low oral immediate toxicity, melamine may be hydrolyzed into cyanuric acid and its mixing leads to cyanuric crystals development in the kidney, which may lead to renal dysfunction, organ failure, and even death of people and animals.

Various analytical techniques were developed to identify the adverse effects of melamine in milk and foodstuffs. The findings were compelling and were suited for melamine detection, for example, in chromatographical methods like high-performance liquid chromatographic/typic spectrometry (UPLC/MS/MS) and gas chromatography/mass spectrometry (GC/MS). However, these chromatographic and mass spectral techniques, aside from their remarkable sensitivity and accuracy, take time at significant operational costs and need competent operators. In addition, preparations of samples for such chromatographic methods are complex and thus do not satisfy the on-site applicability criterion. Thus it is necessary to create lucrative and readily synthesizable / manufactured melamine recognition samples with real time application. Melamine and its analogues have become a global danger to illegal adulteration of milk products. The World Health Organization (WHO) also has a daily consumption of 0.2 mg/kg body weight per day restricted. The experts have suggested several sensory methods for testing for melamine toxicity. Nanomaterial-based sensing methods are among them highly promising in terms of application in real time. These materials reveal and quantify melamine via several processes, such as fluorescence resonance transmission (FRET), aggregation, inner filter effect, surface-enhanced raman dispersal (SERS). Melamine determination nanomaterials include

carbon dots, quantum dots, nanocomposites, nanocrystals, nanoclusters, nanoparticles, nanodots, nanocomposites and nanotubes.

Because of their unique chemical and physical characteristics, nanoparticles were recently chosen to develop new sensors for the detection of different analytes. However, gold and silver nanoparticles (AgNPs), owing to their reduced toxicity, performance characteristics and unique optical characteristics, are extensively utilized (LSPR). LSPR is the most significant characteristic of metal NPs such as Au and Ag utilized to detect analytes visually. If the incoming frequency of electromagnetic radiation matches that of the leading electrons of metal NPs, it is referred to as LSPR.

AgNPs are often produced and operated using melamine. M-AgNPs may be immobilized on the surface of the electrode via hydrogen-bonding interactions between clenbuterol and melamine when they interact with melamine-modified gold electrode in the presence of clenbuterol. This sandwich shape enables clenbuterol to be sensitively and selectively detected. Since M-AgNPs may produce many well-defined sharp silver stripping peaks that mean a very distinctive Ag/AgCl reaction under solid conditions, a relatively low detection limit of 10 pM can be obtained. AgNPs are extensively utilized to detect different analytes owing to reduced costs and increased extinction coefficients. Melamine and AgNPs may have two potential interactions. The first approach is based on the application of unaltered silver.

In this study, we describe a simple and cheap colorimetric technique to detect melamine in milk using silver nanoparticles. Silver nanoparticles are straw yellow in colour, however when aggregated due to melamine changes in colour red/orange.

LITERATURE REVIEW

Jigyasa, Jaspreet Kaur Rajput (2018) Melamine interactions with Ag⁺ ions and biopolyphenols may be ascribed to this. Due to the creation of the aggregated AgNP mass in a low concentration of melamine, light red coloured solution was formed whereas a high concentration of melamine produced a colourless solution that indicated a disruption of AgNP synthesis. In the light of optical answers, UV-visual plots and HRTEM-EDS analyses, the suggested methodology was developed. The sensor tests have achieved a satisfactory detection limit of 0,01 ppm (79 nM) and 0,24 ppm (1900 nM) respectively using Ag-Rutin and Ag-Curcumin. Both sensing tests provided detection limits were much lower than the safety threshold specified by regulatory authorities (20 µM in the US and the EU, 8 µM in Chinese formulas). The sensor tests showed excellent selectivity and sensitivity. The sensor was successfully used to identify melamine in raw milk samples.

S Varun, S C G Kiruba Daniel, Sai Siva Gorthi (2017) Here, a very delicate, specific and fast interference green synthesis was described for determining suspected milk adulterant melamine. Melamine is a nitrogen chemical added to milk to imitate proteins, which leads to renal stones and renal failure. The interaction of melamine with ascorbic acid (AA) results via strong interactions in the production of silver (Ag) nanoparticles, which were verified by UV-Vis spectroscopy and Electron Transmission Microscopy (TEM). Corresponding benchmarks have been validated using High Performance Liquid Chromatography for Melamine Spiked Milk Samples (HPLC). This interference in the production of Ag nanoparticles resulted in colour changes that vary with a melamine concentration, allowing the melamine to be quickly sensed in situ from the milk to a lower limit of 0.1 ppm with a linear correlation of 0.9908.

Karthika Ramalingam (2017) A synthetic chemical substance called melamine (C₃H₆N₆) is illegally added to milk during processing to increase the perceived protein content. A substance known as Melamine, which cannot be metabolized by the body, produces insoluble crystals that may induce tissue damage and kidney failure. As a result, a fast and accurate technique for melamine detection is needed. A simple method for detecting melamine in milk using silver nanoparticles is proposed here (AgNPs). Synthesis of Borohydride-reduced AgNPs, citrate-capped AgNPs, and polyvinyl pyrrolidone-capped AgNPs has been carried out to determine their appropriateness for this application, as well as their size, composition, structure, and others. At various concentrations of melamine, the first two nanoparticles are found to be appropriate for this detection and show a colour shift from light yellow to red. When the combination is exposed to a standard light source, a color sensor is used to detect the melamine content by quantifying the color change and transmitted light intensity. When comparing transmitted light intensity to eye observation of colour change, it is discovered that citrate-capped AgNPs give superior results than borohydride-reduced AgNPs for melamine quantification. Compared to conventional laboratory experiments, the findings of this research are quite similar to those acquired via this study. A home-based electronic melamine testing device may be developed using this approach.

Naveen Kumar (2016) An adulterant used in dairy products by unscrupulous individuals, melamine is a nitrogen-rich chemical substance that increases the perceived protein level of dairy products. In response to this event, researchers devised easy-to-use techniques for detecting melamine in food samples. Silver nanoparticle-based colorimetric technique for melamine detection in milk is described in this study. Melamine causes silver nanoparticles to aggregate, resulting in a sudden shift in hue from yellow to red under optimal circumstances. Using an ultraviolet-visible (UV-Vis) spectrometer, you may measure the amount of melamine in an adulterated sample by measuring the absorption spectrum of silver nanoparticles. Melamine may be successfully detected using a colorimetric technique that uses silver nanoparticles of 35 nm.

Keke Chang (2017) Unmodified gold nanoparticles with localized surface plasmon resonance (LSPR) are used as biosensors to detect melamine in liquid milk samples (AuNPs). An optical attenuator, three 600 m premium optical fibers with SMA905 connections, and an array of linear charge-coupled devices (CCDs) comprise the biosensor. Because it is low-cost and easy to use, the melamine biosensing device is well-proven. Based on the inter-particle coupling phenomenon, which alters wavelength and absorbance in the LSPR band when melamine samples are introduced, the device's operating principle is based on the color change of AuNPs solution from wine red to blue. A linear detection response of the LSPR biosensing system was observed in the concentration range of 0M to 0.9M, with an R2 of 0.99 and a detection limit of 33 nM under optimal circumstances. Testing the LSPR biosensing system on liquid milk samples has shown that it is extremely specific and sensitive, and that it has a wide range of potential applications.

MATERIAL AND METHODS

The techniques described for detecting melamine either utilise visible colour change or the UV absorption approach. The goal of this study is thus to develop an electrical detection system which can quantitatively measure the quantity of melamine. As a preliminary stage, there are three distinct AgNPs: AgNPs with a reduction in borohydrate, NPs with a cap of citrate and NPs with polyvinyl pyrrolidone (PVP). They are then investigated for their features and their applicability to detect melamine in milk. After the raw milk has been contaminated by melamine added, whey protein is isolated and combined with AgNPs and then lit by standard visible light. By means of the suggested system the intensity of transmitted light and absorption variations with concentration is monitored. The findings obtained are compared to conventional laboratory tests and are pleasing. Figure 1 shows a detailed block schematic of the work.

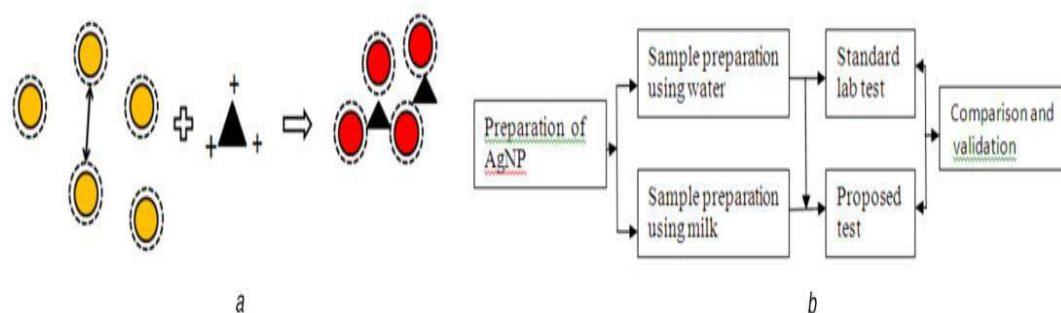


Figure 1: Principle of the proposed work: (a) Electrostatic interaction between AgNPs and melamine, (b) Block diagram of the proposed system

1. PREPARATION OF AGNPS

• Chemicals

Merck Chemicals and Melamine from Himedia were bought from Sigma-Aldrich silver nitrate (AgNO_3), sodium borohide (NaBH_4), tri sodium citrate and PVP. For all tests, double-distilled (D2) water is utilised.

• Synthetization

Method 1: Borohydride reduction AgNPs: A 30ml NaBH_4 (2 mM) solution is produced and put in an ice bath, to keep the temperature constant. Twenty ml AgNO_3 (1 mM) have been added to this solution with a drop of around 20 drops per minute under constant stirrings and a light-yellow solution has been produced. This solution is centrifuged and then filtered for 15 minutes. The filtrate may settle for 8 hours before use.

Method 2: Citrate Capping AgNPs: First, a beaker is prepared with 10 ml of AgNO_3 (0.01M) solution. 10 ml of sodium citrate (0.01 M) is then added to the beaker wisely. Then 10 ml of NaBH_4 (0.01 M) are wisely added to the beaker, when the reaction is quick. The stirring is maintained for 4 hours, with a light yellow solution. This combination may sit for 8 hours and then filter through a filter paper. Before use, the solution is kept at 4°C .

Method 3: AgNPs with PVP capping: A beaker produces first 100 ml of AgNO₃ (1 mM) solution. Then add 20 ml (0.25 M) of PVP to the beaker and stir 10 minutes. Then add 10 ml NaBH₄ (0,01M) wisely to the beaker, stirring constantly for 6 h. A colour shift is noted and a light yellow is produced. The solution is filtered and centrifuged. Then filtrate may rest 8 hours before usage.

2. Colorimetric Detection of Melamine in Raw Milk

The following was a typical colorimetric assay of melamine in raw milk. First, 4.0 mL of the raw milk was put in a 15 mL centrifugal tube and diluted to 10 mL, then added 2.0 mL of 10% mixed acid and chloroform solution and blended into a sample matrix with the vortex for 1 min. The mixture was soniced for 15 minutes at 20°C then centrifuged for 10 minutes at 13,000 rpm to separate the deposit. Secondly, the supernatant was placed in a new centrifuge tube and adjusted to pH 8.0 with NaHCO₃ solution 10 percent. For 10 minutes the solution has been centrifuged to remove the deposit again and the final solution has been utilised for detection. Thirdly, to the 800 mL Ag NPs solution, 600 mL of the solution produced was added, and the combined solution may then react at the room temperature for 20 minutes. Finally, using the 1 cm route long cell, the absorbance spectra of the reacting solution was recorded. The melamine content was measured based on the absorption ratio (A₅₀₀/A₄₀₂) or the inspection of naked eyes. Digital camera also captured the colour change of the mixing solution.

3. Melamine Detection in Milk

It was determined after considerable testing with melamine-spiked water that melamine detection and measurement may utilise borohydride-reducing AgNPs and citrate capped AgNPs as a sample. The newly developed (electronic) method is also sensitive to various concentrations of melamine and exhibits significant variations in output. Therefore, using these two AGNPs melamine tainted milk is now tested and the findings are linked with the conventional laboratory test results. In the first instance, the whey protein in the milk must be isolated and then added to the test sample.

• INSTRUMENTATION

The SPECORD 200 UV–Vis Spectrophotometer (Analytikjena Germany) recorded absorption spectras at room temperature. Transmission microscopy electron (TEM) measurements were performed using a high-resolution transmission microscope of the TECNAI F20 (FEI Co., Holland), operated with an acelerating voltage of 200 kV. A drop of colloidal solution was placed on a carbon-coated copper grid and dried at room temperature in the samples for the TEM analysis. On Malvern Zetasizer ver. 7.03 (Malvern instruments ltd., United Kingdom) equipped with 633 nm He–Ne Laser were determined the size of the nanoparticles. For measuring particle size, Dynamic Light Scattering is employed. Digital pH metre readings were performed (Electronic Corporation of India Ltd.). The centrifugation was done using a centrifuge KUBOTA 6800 (KUBOTA Corporation, Japan). The pictures were shot with digital camera Samsung SL-502.

RESULT AND DISCUSSION

Characterization of Silver Nanoparticles

The silver nanoparticles that have been produced in this research were brilliant yellow. UV–Vis spectra revealed a high absorption maximum of around 397 nm for the spread silver nanoparticles. The aggregation of silver nanoparticles and yellow hue changed to orange/reddish with the emergence of the new maximum absorbance around 540 nm after contact with melamine molecules (Figure 2).

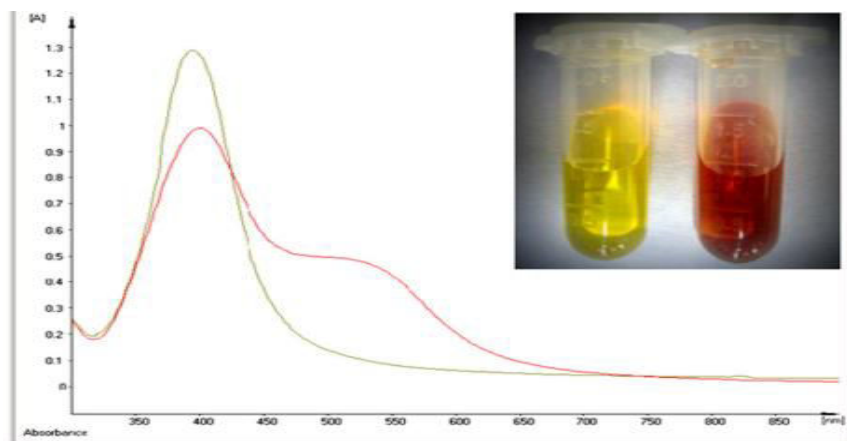


Figure 2: Absorption spectra of AgNPs in the absence of melamine (green line) and in the presence of melamine (red line).

TEM pictures and dynamic light diffusion (DLS) studies verified the agglomeration of silver nanoparticles. In the absence of melamine and the aggregation of silver nanoparticles in the presence of melamine Figure 3 is scattered silver nanoparticles. The increase in melamine content also enhanced the agglomeration of silver nanoparticles (Figure 3).

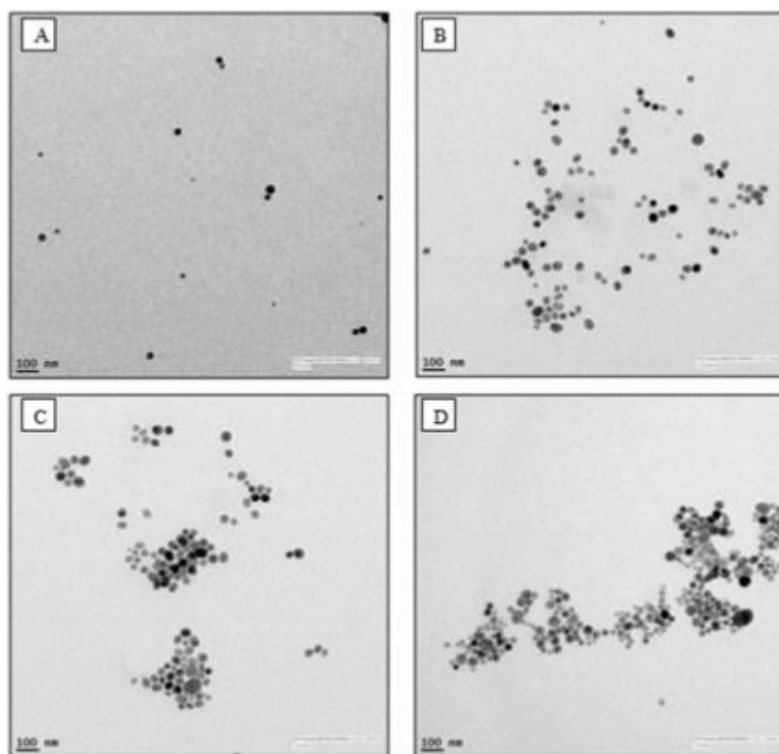
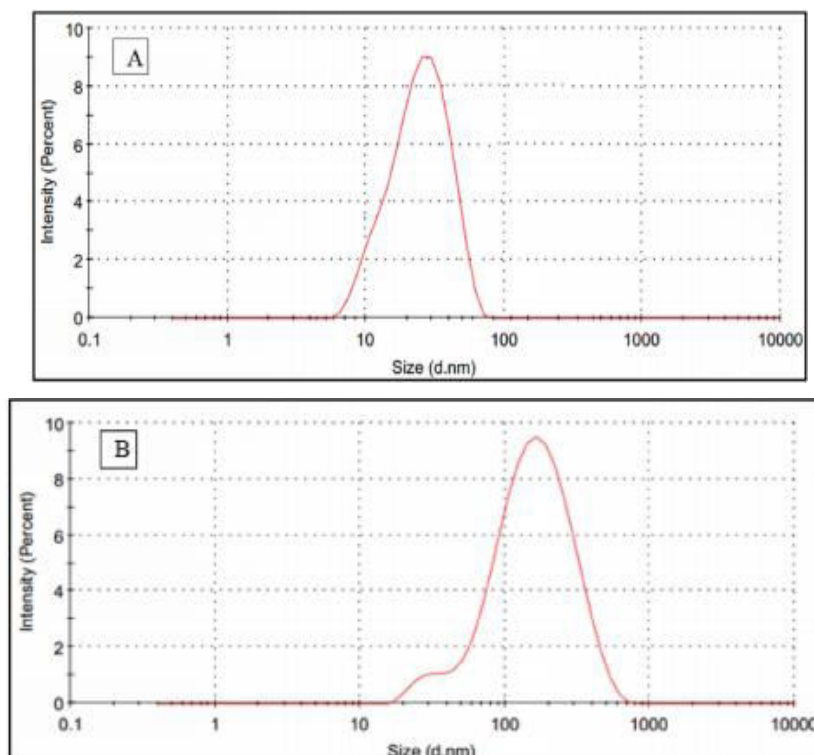


Figure 3: TEM images of Ag NPs A. 600 μ l Ag NPs + 400 μ l H₂O (dispersed); B. 600 μ l Ag NPs + 400 μ l melamine (0.5 mg/l); C. 600 μ l Ag NPs + 400 μ l melamine (1 mg/l); and D. 600 μ l Ag NPs + 400 μ l melamine (10 mg/l) (aggregated)

The findings of DLS revealed the average size of silver nanoparticles as 35 nm, which varied from -23 mV when there was no melamine to -14 mV when melamine was present, into 160 nm and Zeta potentials Figure 4



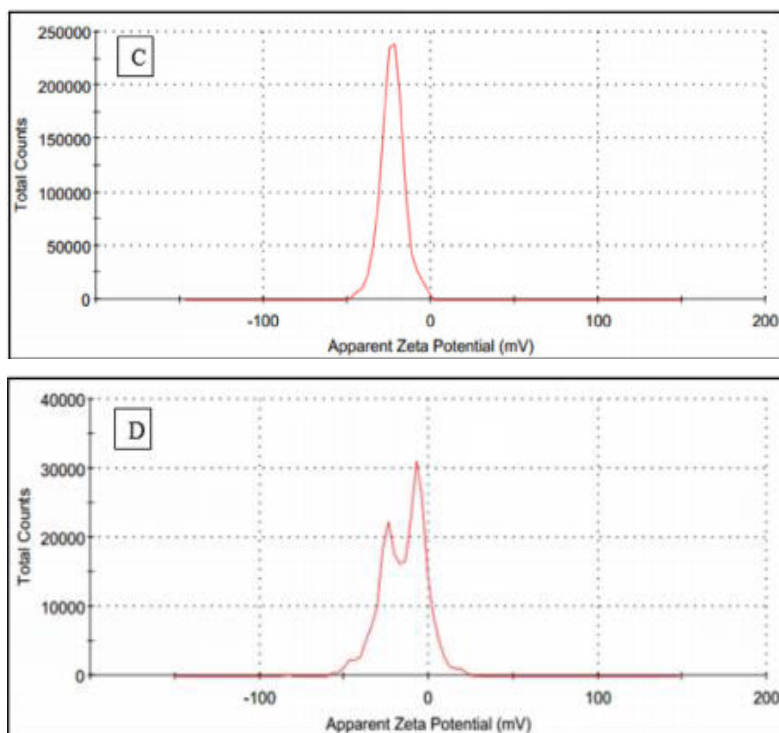


Figure 4: DLS characterization of Ag NPs. (A) Size distributions of Ag NPs (average size 35 nm); (B) size distribution of Ag NPs upon addition of 1 ppm melamine (average size 160 nm); (C) zeta potential of Ag NPs (-23 mV); (D) zeta potential of Ag NPs upon addition of 1 ppm melamine (-14 mV)

The fundamental mechanism of melamine detection utilising silver nanoparticles is described in Figure 4. The silver nanoparticles are stabilised by negatively loaded citrate ions which resist the pull of the Van der Waals and maintain nanoparticles in aqueous solution. If melamine is present, it interacts via hydrogen bonding with negatively loaded silver nanoparticles. The aggregation of silver nanoparticles is caused by hydrogen bondings between silver nanoparticles and melamine molecules. The yellow hue of silver nanoparticles as seen in figure 2 is converted to red and absorption spectra reveal a red shift to 540 nm. One melamine molecule has six active components to make dual hydrogen bonds with another melamine molecule's identical location. With the increasing concentration of melamine, the aggregation and absorption of silver nanoparticles increasing at around 540 nm concurrently increased.

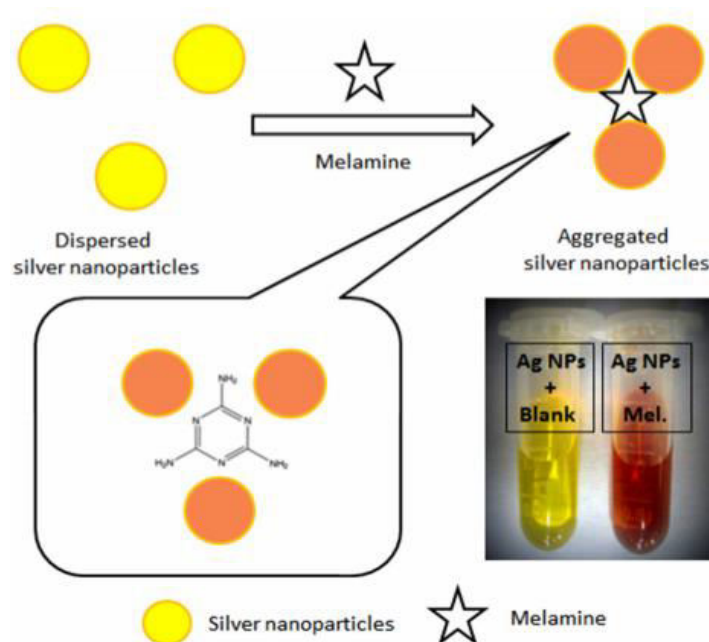


Figure 5: Schematic illustration of melamine detection and visual color change of Ag NPs after addition of melamine. Insert is the photograph of visual color change of Ag NPs upon addition of 1 mg/l of melamine.

If melamine is present, it reacts via hydrogen bonding with negligently charged silver nanoparticles. The aggregation of silver nanoparticles is due to the hydrogen bonding between silver nanoparticles and melamine molecules. When aggregated, the yellow hue of silver nanoparticles changed to red colour and spectrum absorption showed a red shift towards 540 nm. One melamine molecule has six active components to make dual hydrogen bonds with another melamine molecule's identical location. Thus, with the rise of the melamine content, aggregate silver nanoparticles and absorbance spectra have grown concurrently by around 540 nm.

Whey Protein Preparation

Raw cow milk is produced from a livestock farm and melamine is laced, then tested. The following method is used to detect melamine.

- i. The beaker is treated with 200 cc of raw milk, heated at 90°C and cooled down to 60°C.
- ii. 15–20 drops of citric acid or lemon juice may be added and set for 30 minutes at room temperature.
- iii. Milk is divided into whey protein (liquid) and casein at this point (white solid).
- iv. Centrate the mixture for 10 minutes and collect the supernatant (whey).
- v. Whey is further filtered by employing a Whatman filter paper to eliminate casein protein from trace quantities.
- vi. 10 distinct combination inventory solutions (whey contaminated with melamine) are produced at various molar concentrations and subsequently diluted with D2 water for a whey solution of 20 percent.

Measurement of Melamine Concentration in Milk Using AgNPs

After creating stock solutions, 1000 µl borohydrated AgNPs are added to 600 µl melamine spiked (from stock solution). Similar samples are made using citrate capped AgNPs as well. A total of 20 samples (10 AgNP test samples) are thus produced and left to rest for 5 minutes.

If the whey milk protein without addition of melamine is introduced to the AgNPs, the colour of the combination will not change and will stay light yellow. When AgNPs are introduced to melamine-spiked milk, the colour changes into light red and further intensifies into dark red when the concentration of melamine rises (shown in insert of Figures. 6 a and b). This demonstrates the AgNPs' sensitivity to melamine and not to other whey protein components.

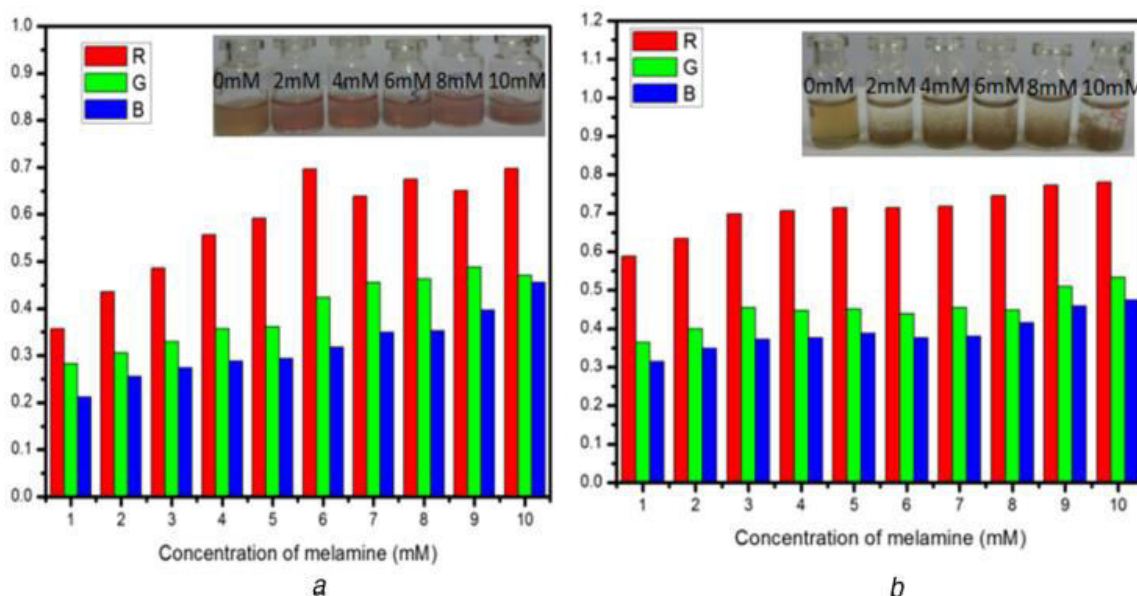


Figure 6: Normalized transmitted light (a) RGB values for melamine spiked milk with borohydride-reduced AgNPs. Insert is the photograph, (b) RGB values for melamine spiked milk with citrate-capped AgNPs.

The samples so prepared are taken one after another in the cuvette and put in the dark cabinet, which is covered in a manner that no outside light penetrates. The standard light is then activated and the sample is irradiated. The light passed through the sample is captured by the sensor and the RGB values for all samples are recorded. Figures 5a and b illustrate the chromatic depiction of these samples. The colour sensor RGB graphic indicates that while red colour changes dominate, other colour changes as well and thus the total intensity is measured and traced as well in Figure 7.

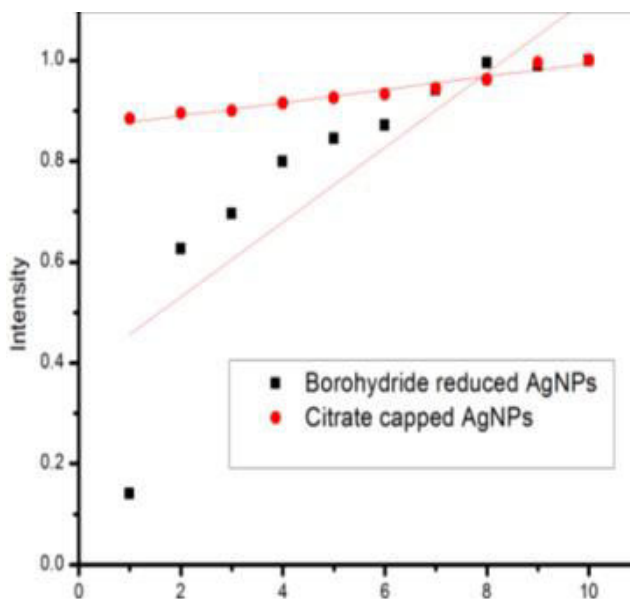


Figure 7: Insert is the photograph transmitted light intensity

Detection Principle of Melamine Using Unmodified Ag Nps as Colorimetric Probe

Ag NPs may be stabilized in aqueous solvent by covering it with negative citrate ions. With a homodispersion of Ag NP, the electrostatic force will counterbalance the effects of Vander Waals force among molecules. The melamine molecule is a tiny molecule containing three exocyclic amino groups (eNH_2) and a hybrid ring containing three nitrogens. The negatively loaded citrate ions may be connected with positively loaded exocyclic amino groups (eNH_2), resulting in the attachment of melamine molecules on the surface of the Ag NPs. When melamine were added to the Ag NPs solution, the Ag NPs aggregated the colour of the Ag NPs solution concurrently with spectrum changes as seen in Figure 7 Ag NPs may be added either via the three exocyclic amino groups (eNH_2) or the hybrid ring of three nitrogen. We performed the control experiment using cyanuric acid as a melamine replacement to investigate the actual cause for Ag NP aggregation. To generate cyanuric acid, melamine is readily hydrolyzed. Three hydroxy groups in the chemical structure of cyanuric acid.

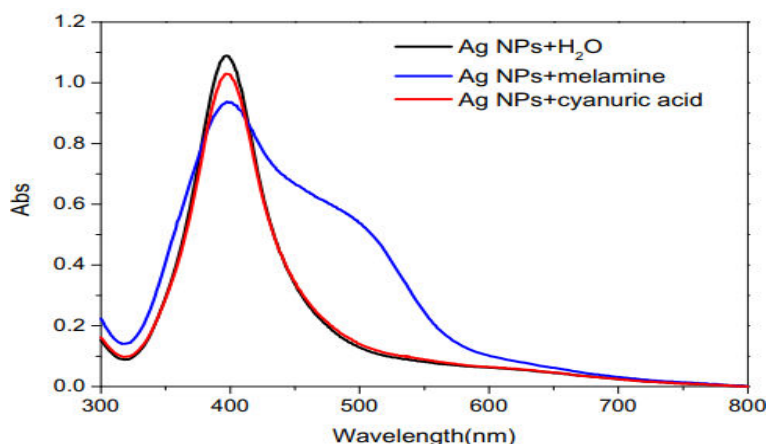


Figure 8: Absorption spectra of Ag NPs in presence of water (black line), cyanuric acid (red line) and melamine (blue line). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

(-OH) replace three melamine amine groups (eNH_2) and the three hybrid nitrogen ring remains. The test findings revealed, as shown in Fig. 8, that cyanuric acid cannot cause the aggregation of Ag NPs. It is clear that just three amino melamine groups are essential to the interaction between melamine and Ag NPs. The three amino groups produced a fast colour shift from yellow to red, while the three-nitrogen hybrid ring is answerable for melamine-Ag NPs' interactions. On the other hand, there are six comparable sites in every melamine to create a double $NH-N$ hydrogen link with another melamine molecule's identical location (Li et al., 2010; Silly et al., 2008). We reasoned that the neighbouring melamine-coated Ag NPs might be interlinked between melamine molecules by $NH.N$ hydrogen links, as scheme 1 shows Aggregation of Ag NPs may thus be triggered. Scheme 1 shows the colorimetric detection method for melamine via label-free Ag NPs.

CONCLUSION

For the detection of melamine in milk, a simple, fast, and sensitive colorimetric technique has been devised with the help of its adsorption on silver nanoparticle surfaces by amine groups. We introduced a simple and sensitive colorimetric technique for melamine detection in milk samples in this article. The colorimetric technique and melamine have been developed using 35 Nm yellow-colored silver nanoparticles, and if present in the sample, the aggregation of silver nanoparticles results in visible changes of colour between yellow and red. The simple colour shift of silver nanoparticles may also be utilized to indicate the use by advanced equipment of melamine adulteration.

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Survey on the Socio-Economic Parameters of Chicken Production Pattern and Farmers in the Field of Lucknow, India

Kamal Jaiswal, Komal Singh and Suman Mishra

ABSTRACT

Poulterer or poultry farmer (men or women) farming of hens/chickens serves to provide work and becomes one of the most significant sources of income, resulting in increased household economic advantages. However, there was only a little amount of data available that showed the chickens' contribution to the socioeconomic statistics. The potential for chicken production in Lucknow, India was investigated in this study. The chicken used in the study was "Kadakhnath," which was found in the poultry of several Lucknow locations. A standardized questionnaire, formal and informal interviews, and group discussions with local livestock caretakers were used to collect data. A total of 350 people were questioned, with males accounting for 21% of the total and females accounting for the remaining 79%. In 79 percent of the families, the complete family was responsible for chicken management; however, only women were involved in 38 percent of the houses, and only males were active in 9 percent of the households. The contribution of chicken production socially and economically among these categories varied significantly ($p < 0.005$).

Keywords: Poultry, socio-economic, Questionnaire, Kadakhnath, chickens.

INTRODUCTION

In many sections of the rural and urban areas, chicken farming has made a substantial contribution as a source of protein, food security, employment, and revenue in resource-strapped societies [1,2]. The country's entire chicken population is projected to be 39.6 million [3]. The vast majority of these hens (99 percent) are kept in a conventional system with little or no housing, nutrition, or health care [4]. Area chicken is an important component of rural household subsistence in most parts of Ethiopia as a source of financial revenue and nutrition [5]. In India, indigenous chickens make for 99 percent of the entire chicken population. They are controlled under complex systems. This suggests that almost every family in rural Ethiopia has traditional chickens because they offer protein for the rural people and create family money. Chicken breeding is a viable occupation and an alternative revenue source for rural Ethiopian farmers since the indigenous hens are good scavengers and foragers, well suited to adverse environmental conditions, and require less space [6]. Furthermore, the local chicken industry contributes considerably to human livelihood and food security in low households [7,8]. Lack of information about poultry production, a scarcity of feed, the presence of economically relevant illnesses as well as institutional and socio-economic restrictions remain key hurdles in Area-based chicken production in India [9]. Despite the importance of chickens, their keeping might be regarded an off-the-beaten-path agricultural operation.

In developing nations, livestock production in general, and chicken production in particular, play critical socioeconomic roles [10]. The growth is not just in terms of size, but also in terms of production and quality. The impacts and contributions of large-scale and small-scale scavenging poultry production systems in rural areas differ from those of more intensive systems in urban areas. Backyard poultry in rural areas contributes significantly to poverty reduction through money creation and household food security [11,12]. Rural communities own Area chickens for a variety of reasons, including the provision of animal protein, the generating of additional economic revenue, and religious/cultural concerns.

Education, age, land, farm experience, and access to finance have all been linked to agricultural productivity and profit in previous studies, hence the current study was carried out to investigate the socio-economic profile of Kadakhnath farmers.

Chicken production systems are subject to a variety of complicated and variable limitations, all of which have an impact on their output and productivity potential. The design and execution of Area-based chicken development programmes that can benefit rural societies require knowledge and understanding of chicken production and use systems, as well as possibilities and restrictions. As a result, the study's goal was to gather baseline data on Area-based chicken production systems, use, potential, and problems. In such a pandemic situation of COVID19 it becomes a source of income for the poultry farmers.

MATERIALS AND METHODS

A thorough random survey was conducted to gather information on many elements of feeders usage, such as kind, frequency, dose, and farmers' perspectives on subjects such as chicken's health impacts, economic

factors, and strategies. The random selection approach was used for the sample. Personal, use and protective measures, and health issues were the three components of the thorough survey.

SITE OF STUDY

The current research was conducted in several areas of Lucknow, Uttar Pradesh, India. Kadaknath chickens were selected for the study from a variety of poultry farms in five different areas across Lucknow. The survey locations were chosen based on the criterion of being heavily used for chicken production and being well-maintained. Farmers' willingness to participate in the survey and their level of participation in poultry farming practices. From September 2020 to August 2021, the survey was conducted.

Table 1: Description of the various locations situated in Lucknow.

S. no.	Area	Locations	Latitude	Longitude
1	Area 1	Indira Nagar	26.883301	80.983299
2	Area 2	Aliganj	26.904054	80.945272
3	Area 3	Jankipuram	26.921021	80.951187
4	Area 4	Ghaila	26.9109084	80.8848139
5	Area 5	Bara Imambarah	26.868935	80.912695

Data Collection: The respondents (both females and males) were selected randomly based on various parameters. To avoid biased results and to gain factual insight of the farm practices adopted by the Areas, the respondents were not pre-informed and interviews were collected in the local language, only those respondents were selected who were willing to participate in the survey.

Data was collected by means of a structured questionnaire, one-to-one formal and informal interviews, and group discussions. The information was extracted from the respondents on commonly farming and production recorded for the surveyed chickens, moreover, the factors that affect production and help in economical welfare.

Overall, the data collected were classified into three sections i.e.(i) Area profile (ii) house hold profile, (iii) cost and returns in poultry farming. The questionnaire was premeditated in the form of closed-end questions in either a multiple-choice format or questions with yes/no as answers. Both formal and informal interviews included personal interactions and the questions demanded multiple answers.

Data Analysis: The collected data were presented using various statistical tools like mean and standard deviation to draw meaningful conclusions and presented using pie charts.

RESULTS AND DISCUSSIONS

A total of 350 people were questioned, with males accounting for 21% of the total and females accounting for the remaining 79%. Where in 79% cases entire family members were responsible for the management of chickens, whereby, in 38% of the households only women were involved, and in 9% of the households only men were involved.

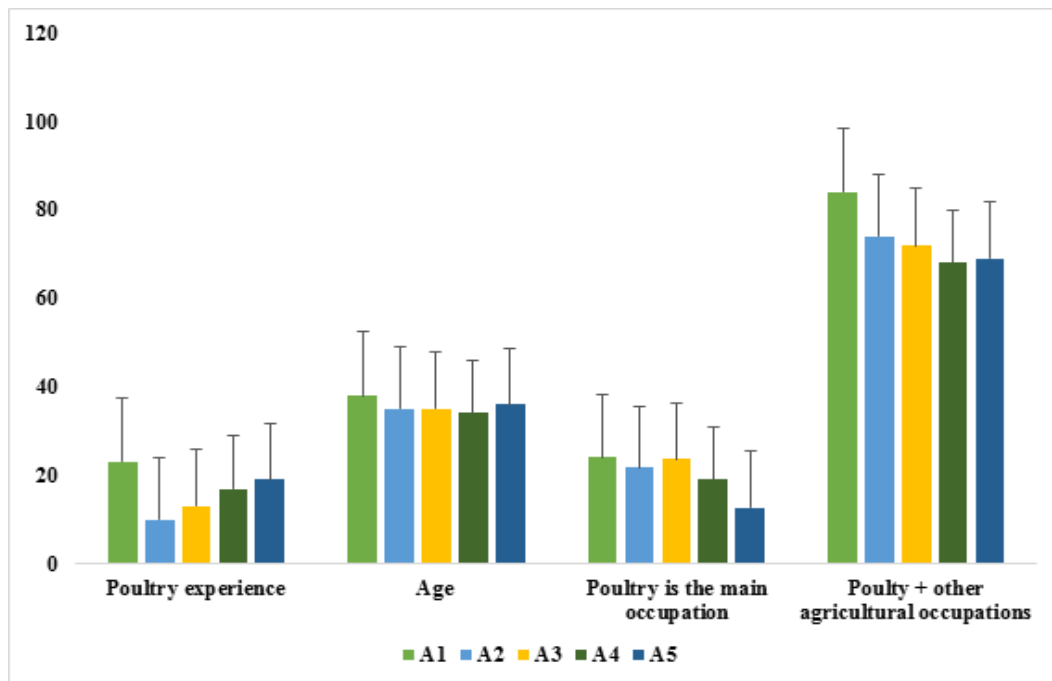
The first section of the Area Profile focuses mostly on the transportation features of the Areas, such as road and train links, as well as the distance between the producer's Area and the metropolitan center. This in turn allows us to determine the impact of transportation costs on the marketing of the end product (especially for poultry farmers who sell the products directly, and it was discovered that because the peri-urban areas of Area 1 are well developed with transportation facilities, the producers face little difficulty in either selling the produce directly or selling it to their traders.

Table 1: Infrastructure availability (in the Areas of the producers)

S no.	Availability	A1	A2	A3	A4	A5
1	Connectivity to road	+	+	+	-	+
2	Connectivity to railway	+	-	-	-	-
3	Post office	+	-	+	+	+
4	Veterinary hospital	+	+	-	-	-
5	Veterinary dispensary	+	+	-	-	-
6	Rural bank	+	+	+	+	-

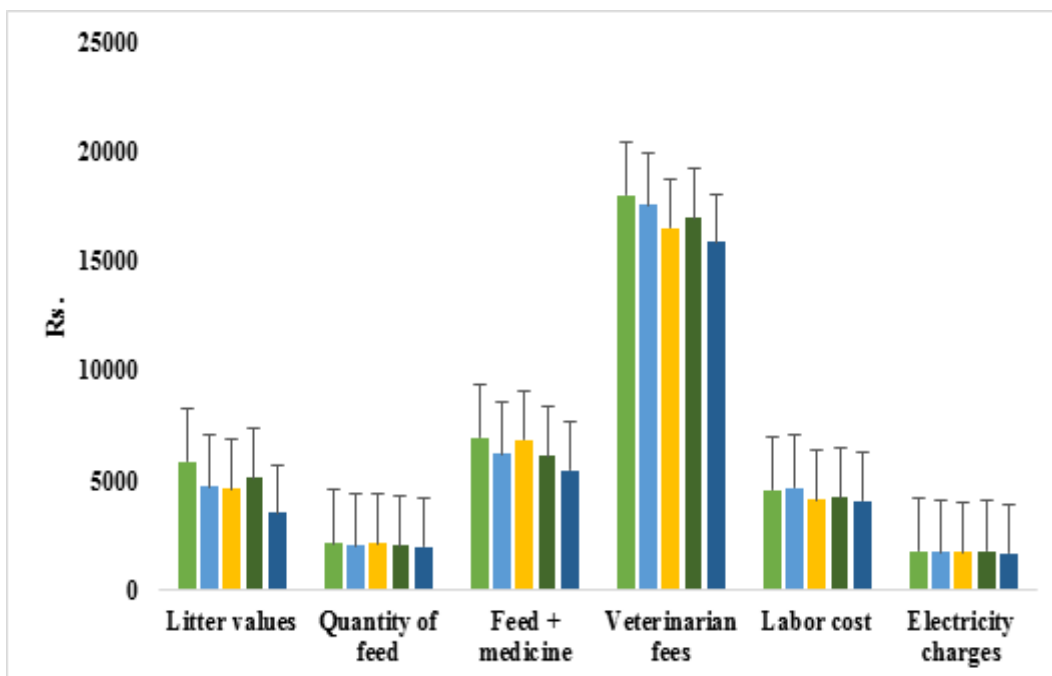
The farmers are provided with day-old chicks, feed, vaccinations, and medications by the farms/hatcheries. The producer is responsible for providing land, labor, and other variable inputs like power, which is not the case for producers, who must travel to a neighboring urban area to do any business related to chicken keeping.

The characteristics of poultry producers make up the second section of the questionnaire. The graph shows that growers have greater experience with poultry rearing and that producers between the ages of 35 and 36 are more interested in poultry rearing than growers over the age of 40.



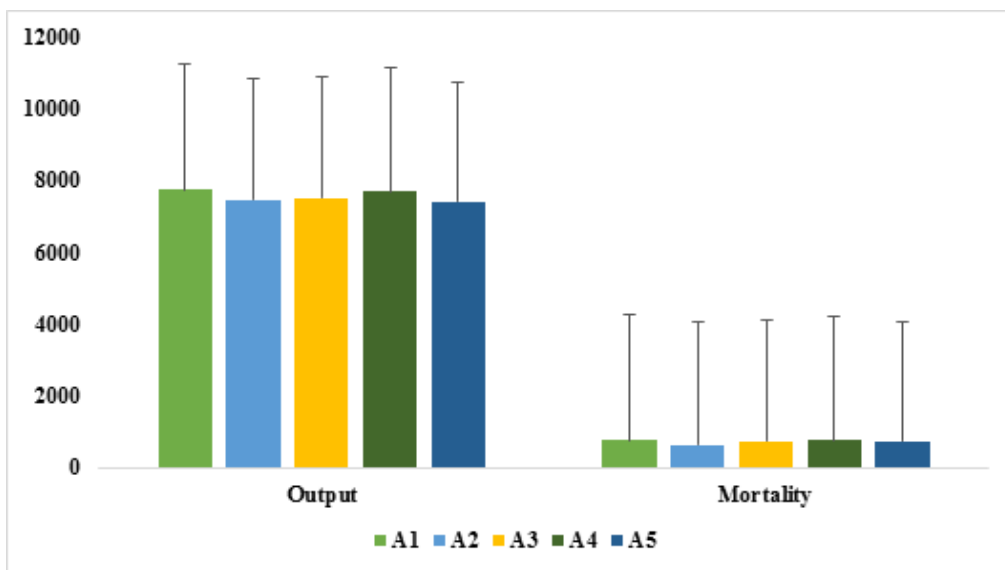
Graph 1: Features of poultry producers

The third section of the questionnaire covers the input, production, and income for producers every cycle. The table and graph show that farmers have longer production cycles and spend less on labor medication, and immunization than contract growers, but their feed amount is higher even if their flock size is less.

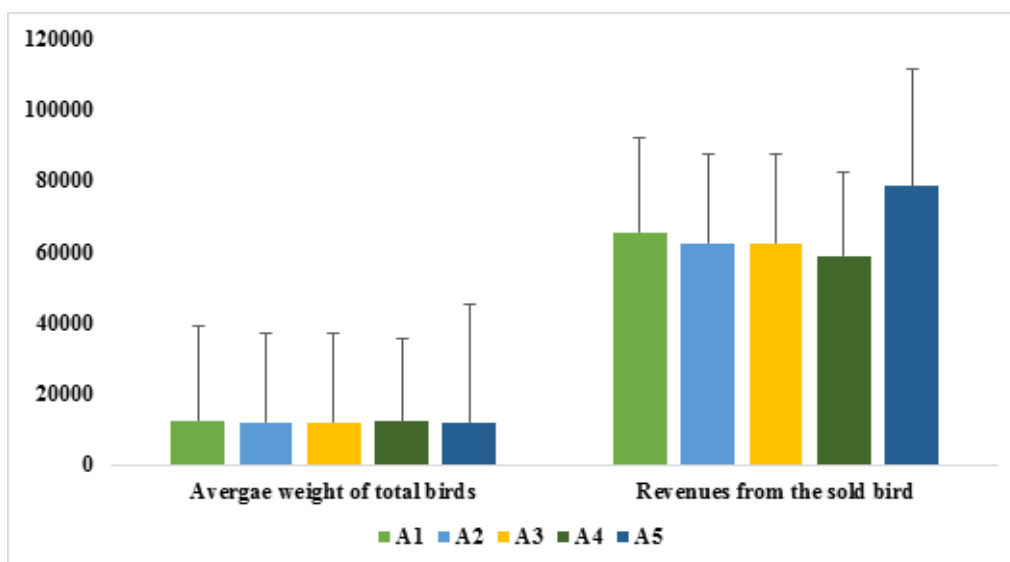


Graph 2: Input, production, and income for producers every cycle.

This graph attempts to compare grower output and income. Area 1 producers have larger chick sizes housed in their output, even though the kgs sold is not much higher, the amount they receive on the whole is more, which is not the case for other Area growers. This is because the company ensures that the quality produced is of high standards and sells it to the trader where it fetches a higher price, and the producers of Area 1 are also assured of the price incentive when price fluctuations are observed.



Graph 3: Grower output and income.



Graph 4: Studies on revenue generated.

The growers, i.e., the information shared between farmers and processors, are the focus of the questionnaire's last part. As previously stated, the corporation provides the chicks, feed, medications, and other veterinary services for poultry, while the farmer is responsible for providing land, buildings, labor, and other variable inputs such as disinfectants and power.

The farmers' out-of-pocket payments for inputs account for less than 6% of total input costs on average. In all types of production, the key components of manufacturing costs are listed in the table below. It is clear that the cost structures of the two manufacturing processes are comparable. Around 74% of the entire variable cost is made up of feed, medication, and veterinary services. Chick expenses represent roughly 20 percent of overall variable costs, while labor and electricity rates account for about 4-5 percent.

A hypothesis was calculated by incorporating a few common characteristics of both contract and non-contract farmers to determine their similarities and whether they contribute to and have a positive (+) effect on improving the farmers' living standards. It was discovered that all of the characteristics have a positive effect and do contribute to improving the farmers' living standards in both sectors. Because the business bears the market risks to some level, risk-sharing between the producer and the firm is a significant benefit in the chicken production industry. The corporation is responsible for up to 5% of the mortality risk.

For every 1% rise in mortality above 5.4%, the business charges Rs. 0.9 per kg of live body weight of the grown-up chickens. This type of risk-sharing system protects producers, particularly marginal and small-scale landholders, in high-risk and turbulent market scenarios. Chicken farming suggests that it is a viable source for farmers, all of which are advantageous to the producer if not all of these are difficulties.

CONCLUSION

We find that the profits to producers are substantially larger in cost. This is because the poultry processor selects individuals whose skills, expertise, and access to credit market give them comparatively poor prospects as independent growers. The better technology and specialised management methods are the second key benefit of contract farming. As a result, there is a reduction in feed consumption.

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AI Based Automatic Attendance System Using Face Recognition

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ABSTRACT

In all over the world, taking attendance of the students is day to day activity for all the teacher's in an institution or schools. Traditionally, the teacher's taking attendance through a roll call of every students. This takes a lot of time and may sometimes lead to a false attendance. Once the attendance is taken teachers need to maintain the attendance register. But sometimes maintain the attendance register is very difficult task for teachers. various types of techniques and algorithm are used for overcoming this situation. In this project we are decided to reduced the problem of taking attendance using Local Binary Pattern Histogram Algorithm (LBPH). This algorithm is used for face recognition. LBPH algorithm is machine learning approach because it trained the machine for marking the attendance. Face detection process is used in LBPH algorithm. For using this, teacher's can take attendance easily and automatically.

Keywords: Attendance, LBPH, Face recognition, Machine learning , Face detection.

IX. INTRODUCTION

This is the AI based Attendance System Model. Automatic Attendance System is necessary in all organization for checking the activities of each and every students. In all schools/colleges attendance are taken manually by calling their register numbers or names and noted in attendance register. This technique is repetitive, complex for teacher's to maintain the data of many students. During this Covid-19 pandemic, We can see all school/colleges taking Online classes . After classes teacher's take attendance but during this errors are occurred like, few students regularly mark present for their absent students. For teacher's it is very difficult to track every students and difficult to find fake attendance of students. Our main goal of proposed this project is to reduce the time limit for taking attendance. Automatic Attendance System is a attendance monitor on the basis of facial Automatic Attendance System will record attendance, date and time of arrival of student based on their face recognition. Automatic Attendance System uses Local Binary Pattern algorithm for face recognition. For using an automated attendance system, teacher's takes less time for taking the attendance of the students. An automated attendance software is the need for modern world because it detects accurate faces and avoid human error. The main advantage of an automated attendance system is gives more accurate results.

X. LITERATURE SURVEY

Author [1] created a method that uses note PCs for all students to manage the context of the students for the classroom lecture. The attendance and location of the pupils are obtained since this system uses each student's note PC. However, understanding the lecture's specific circumstance is challenging. Face photos are captured by our system.

A variety of face recognition algorithms have been proposed in the last decade [2], however most of these works only deal with a single image of a face at a time. Our method solves the difficulty of face detection and improves the accuracy of face identification by continuously studying facial information.

Paul Viola and Michael J. Jones [3] suggested Robust Real-Time Face Detection. Only when using systems based on their suggestion were they beneficial. Diverse parameters that could not be controlled at all times, such as changes in the person's position, changes in the brightness of the environment, and so on, were among the limits. As a result, when the systems aren't used within the limits, they're labelled as inefficient.

In this paper author proposed Real Time Human Face Detection and Tracking [4]. Their research [1] offers a method for real-time profile detection and recognition based on a modification of the Viola-Jones algorithm. The results of the new method demonstrated that computers using the modified approach could detect and track up to 50 human faces. In such systems, data processing and time consumption are significantly reduced.

Author proposed implementing an Attendance Management System. Systems based on this idea would use a web camera to collect an image at various times. In such systems, an accuracy of 68 percent has been found. In addition to the Viola-Jones algorithm, Varsha Gupta and Dipesh Sharma (2014) investigated the Local Binary Pattern (LBP), Adaboost algorithm, local successive mean quantization transform (SMQT) Features, sparse network of winnows (SNOW) Classifier Method, and Neural Network-based face detection methods. They came to the conclusion that the Viola-Jones algorithm is the fastest and most accurate of all the approaches. Other

approaches for face detection, such as Local Binary Pattern and SMQT Features, offer easy calculation and can deal with illumination issues, but their overall performance is inferior to the Viola-Jones algorithm.

In this paper author created Viola-Jones algorithm for face detection for student attendance system . They determined that, among methods such as face geometry-based methods, feature invariant methods, and machine learning-based methods, the Viola-Jones algorithm is not only fast and robust, but also has a high detection rate and performs well in a variety of lighting conditions.

RFID and Arduino are used to create a face and biometric-based attendance and security system. They presented a face and biometric-based employee attendance and security system using Arduino and Smart RFID cards in this article. The goal of the project was to implement an RFID-based attendance system that combined face recognition with a unique employee number. The system's security has been improved by using finger print authentication (Bio-metric). For unauthorised employees, an audio welcome message was introduced on the valid employee attendance registration. Sound Alarm [2] and Audio Alert[1] had both been presented.

Face-recognition-based attendance system. The goal of this article was to improve school and college attendance systems. As a result of the numerous drawbacks manual attendance, such as expense, phony attendance, and so on. It is possible that the information provided is not always accurate. As a result, biometric and facial recognition systems are used. Techniques of recognition are employed. Face of tradition. The methods of recognition were not any more precise. This piece of writing included portrayed the idea of saving time while also improving Face-recognition-based security attendance system It was a very helpful strategy. Images were captured by this concept. in a school/college with a camera or CCTV camera for purpose of attendance Then it used facial recognition software to find the face. Eyes, nose, mouth, hairs, and different poses of the human body the image of a face Face-lifting techniques came in a variety of styles.

Student Attendance System Using Iris Detection, In this proposed system, the student is asked to stand in front of the camera so that the system may detect and recognise their iris and mark their attendance. The iris is detected using methods such as Gray Scale Conversion, Six Segment Rectangular Filter, and Skin Pixel Detection. It aids in the prevention of proxy difficulties and effectively maintains student attendance, but it is a time-consuming process for a student or staff member to wait for the prior members to finish.

XI. PROPOSED SYSTEM

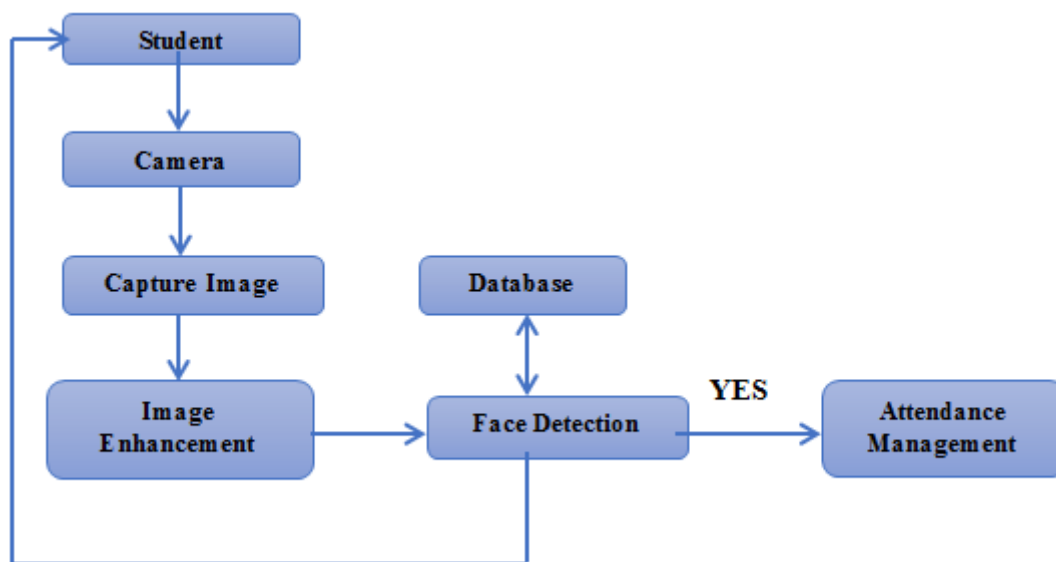


Fig. 1: Data Flow diagram

The Required Steps are as Follows

- When students entered in class he/she stands in front of camera.
- Camera captures the image of students.
- After capturing the image, image enhancement will start.
- When image enhancement is done then image is going to the stored database for checking similar face of students.

- If similar face is found in a database face detection process will start.
- After this, system will recognize the face of students using Local Binary Pattern Histogram algorithm.
- Once the face is recognized the attendance of students automatically marked with their name, id, department and date.
- If not detected, the system will revert the process using all steps.

XII. METHODOLOGY

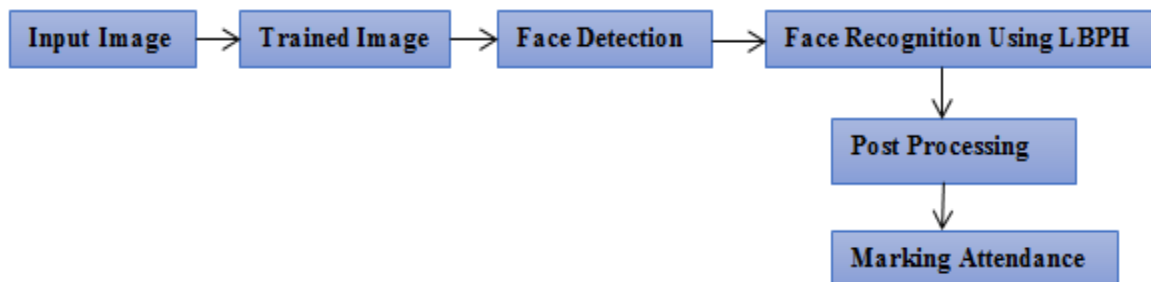


Fig. 2: Flow chart of methodology

Input Image: Input image is the initial stage of face recognition. In this camera captures the original image of students. Because every facial related activity needs to be captured image.

Trained Image: After capturing input image, image must be going through the training process because machines do not understand the image properly that's why machine can not recognize the face of person.

For training, we can take sample of images and convert them into gray scale.

Face Detection: After trained image, system will understand that the image given as an input is searched to find any face. For face detection we used Haar Cascade classifier frontal face. After detecting the features of the image, recognition process will start.

Face Recognition Using LBPH: After the completion of detection process, image going through the LBPH algorithm. Using LBPH algorithm system will be ready to recognize the person's face.

Post Processing: After completing all the process, Post processing will start. In this, machine understands or reads the real-time image and then marks attendance in an Excel sheet with name, id, roll no.

Marking attendance: Marking attendance section shows real-time attendance of students.

XIII. HAAR CASCADE CLASSIFICATION

Paul Viola and Michael Jones introduced an effective approach for detecting objects using Haar cascade classifiers in their work "Rapid Object Detection with a Boosted Cascade of Simple Features" in 2001. Object detection is a machine learning-based strategy that involves training a cascade function using a large number of positive and negative images.

Positive example is a classifier (specifically, a cascade of boosted classifiers working with Haar-like features) that is trained with many examples of a specific object (e.g., a face or an automobile). So, if you train your classifier with those kinds of variables, you'll be able to detect everything you want. If you want to detect faces, for example, you'll need to train your classifier with a large number of photos that contain faces. So, these are known as positive photos, and they contain the object you're looking for. Similarly, we want to train the classifier with negative photos, which are images that don't include the thing you're looking for. For example, if we want to identify a face, we should use an image that does not contain a face. After training, a classifier can be applied to a region of interest in an input picture, with the classifier returning a 1 if the region is likely to show the object and a 0 otherwise.

We'll be working on facial detection here. The cascade function requires a large number of positive images to train the classifier at first, which includes negative images and faces (images without faces). After that, we must extract features from it. We use Haar for this. The characteristics in the graphic below are utilized. They're really similar to our convolutional kernel. Each characteristic is said to have a single value. The sum of pixels beneath the white rectangle is subtracted from the sum of pixels under the black rectangle.

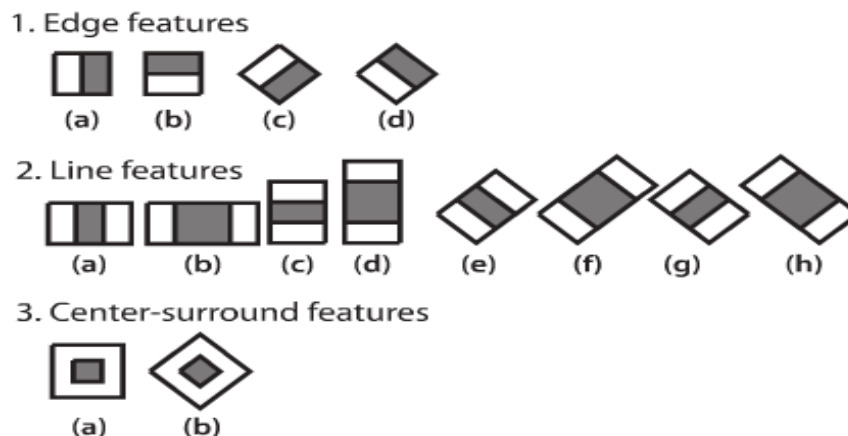


Fig.3: Haar Cascade classifier diagram

Using Haar Cascade classifier the machines are able to find out the main image of students. Firstly we have to collect all the positive and negative images of students for training our classifiers. Using haar features we only select the features of minimum error rate because they are the features that most accurately classify the face and non-faces images.

XIV. Local Binary Pattern Algorithm (Lbph) :

The Local Binary Pattern Histogram (LBPH) algorithm is a local binary operator-based face recognition technique that can distinguish both a human's faces i.e. side and front face. LBPH is most widely use for face recognition for identifying accurate faces. LBPH works on different expressions of human's. Accurately identified each features of the images.

Working of the LBPH Algorithm:

The LBPH algorithm depends upon four parameters:

- 1. Radius:** The distance between the centre pixel and the circle of the circular local binary pattern, this is usually 1.
- 2. Neighbours:** The number of sample points required to construct a circular local binary pattern Keep in mind that the higher the computational cost, the more sample points you include. Normally, it is set to 8.
- 3. Grid X:** It represents the number of cells in the horizontal plane, is usally 8.
- 4. Grid Y:** It represents the number of cells in the vertical plane, is usally value of 8.

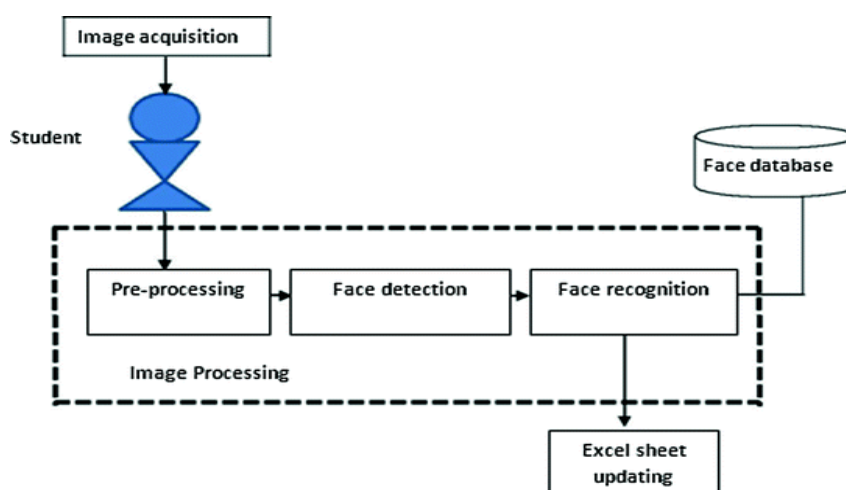


Fig.4: System architecture of LBPH

Steps Involved in LBPH

- 1. Image Acquisition:** In Fig(1) Image acquisition is the initial stage of every image processing that means camera captured the input image of every person.
- 2. Pre-Processing:** The purpose of Pre-processing is used to improve the image quality so that we can better analyse it more effectively. By processing we can eliminate undesirable distortions and boost some crucial

qualities for the application. Whenever we are working on image processing firstly, we convert any image into gray scale because gray scale has one color. And it is the only portion that is not removed. For using Gray scale pixel of every image is clearly identified.

3. **Face Detection:** After preprocessing, face detection is started. In face detection system identifies the every person's face.
4. **Face Recognition:** After face detection, face recognition is started by using LBPH algorithm. It is responsible for identifying the features of the image.

Pseudo Code of LBPH Algorithm

Input: Live camera on student face.

Output: Mark attendance in excel sheet

1. Convert each image into grayscale.
2. Apply all the process for extracting the image.
3. Applying the LBPH algorithm for calculating the features of the images.
4. **If** face is detected then mark attendance in excel sheet **Else** not mark attendance in excel sheet.
5. Revert back all the process.

Calculating LBPH Algorithm

- Consider the image, which has the dimension NXM.
- To create an MXN dimension, We must partition each region of an image into region of equal height and breadth.
- Entire region apply the LBP operator. The LBP operator is specified in a 3x3 window.

$$LBP(x_c, y_c) = \sum_{p=0}^{P-1} 2^p s(i_p - i_c)$$

$$s(x) = \begin{cases} 1 & \text{if } x \geq 0 \\ 0 & \text{else} \end{cases}$$

- This is the formula of LBP. Here, x and y are the co-ordinator of pixels. i_p is the neighbor pixel and i_c is the center pixel. The LBP operation clearly understand with help of example.

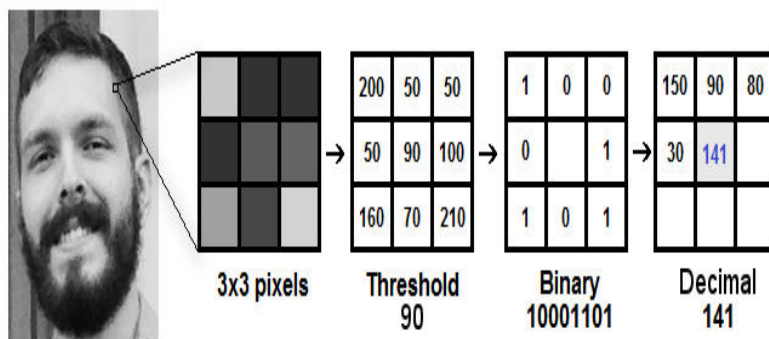


Fig.5: Example of LBPH Calculation

- In Fig (2) Shows, We can clear about the process of LBPH. In this,
- First we have to convert input image into grayscale. Every image has a different pixel value.
- LBP calculates every unit pixel value in each rectangular block.
- It compare a pixel to it's eight closest neighbours, by using median pixel value as a threshold.

- If mid number of rectangular block is less than the neighbor pixel value then it is considered as 1.
- If mid value of rectangular block is greater than the side pixel value then it is considered as 0.
- After getting all the binary value, we need to convert in decimal value.
- After computing the LBP value, a histogram is constructed for each part of the image [18].

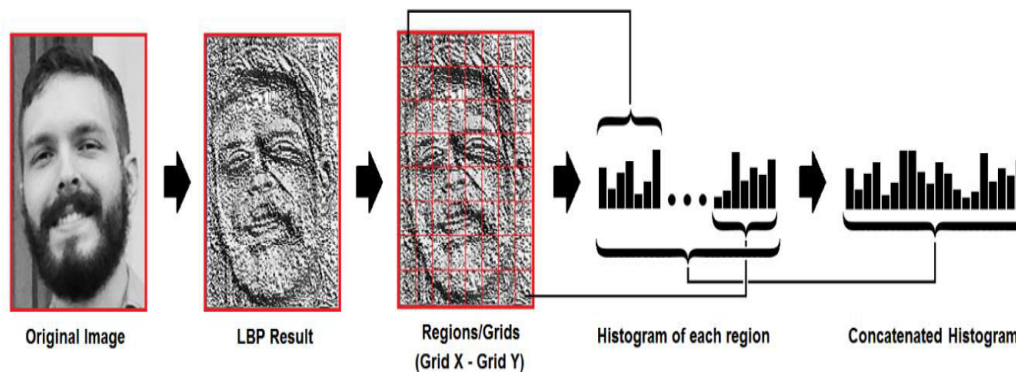


Fig.6: Histogram extraction

- We are taking 60 images for extracting the features. Histogram extract the input images in various ways and gives the accurate result.
- Fig.6. shows extraction of original image and converting the image into grayscale after that calculating the histogram into grayscale image .

$$d(x, y) = \sqrt{\sum_{i=1}^n (y_i - x_i)^2}$$

- We are calculating the histogram using euclidean distance formula.

XV. RESULTS

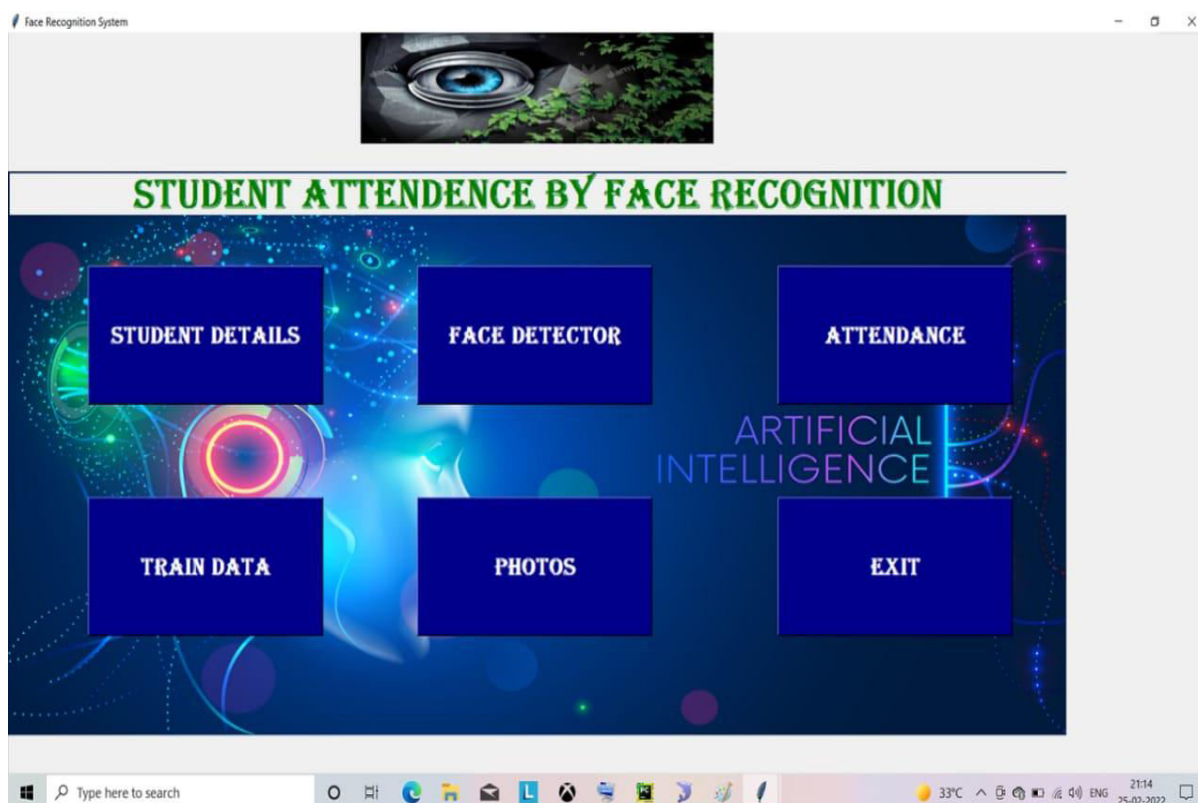


Fig.7: Graphical User Interface (GUI)



Fig.8: Generation of Dataset

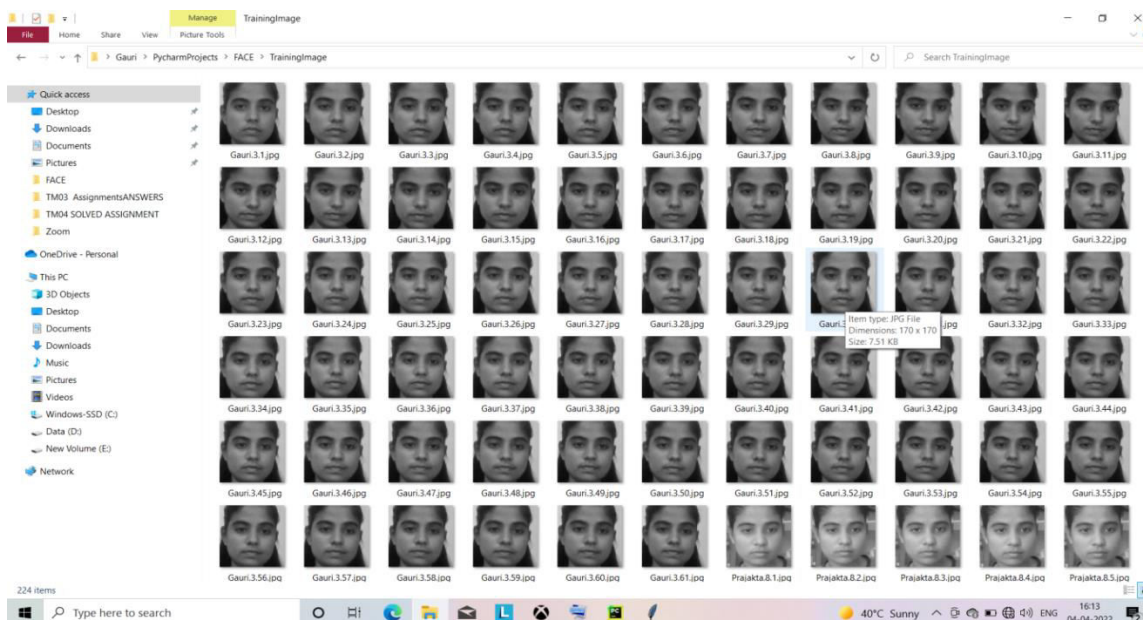


Fig.9: Generation of Dataset Completed

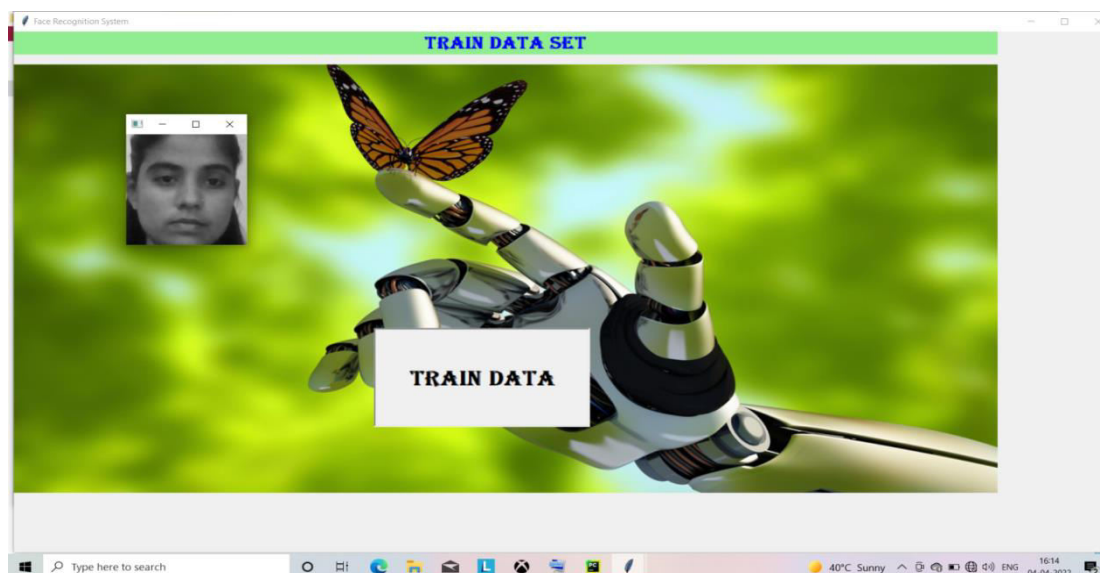


Fig.10: Trained Image

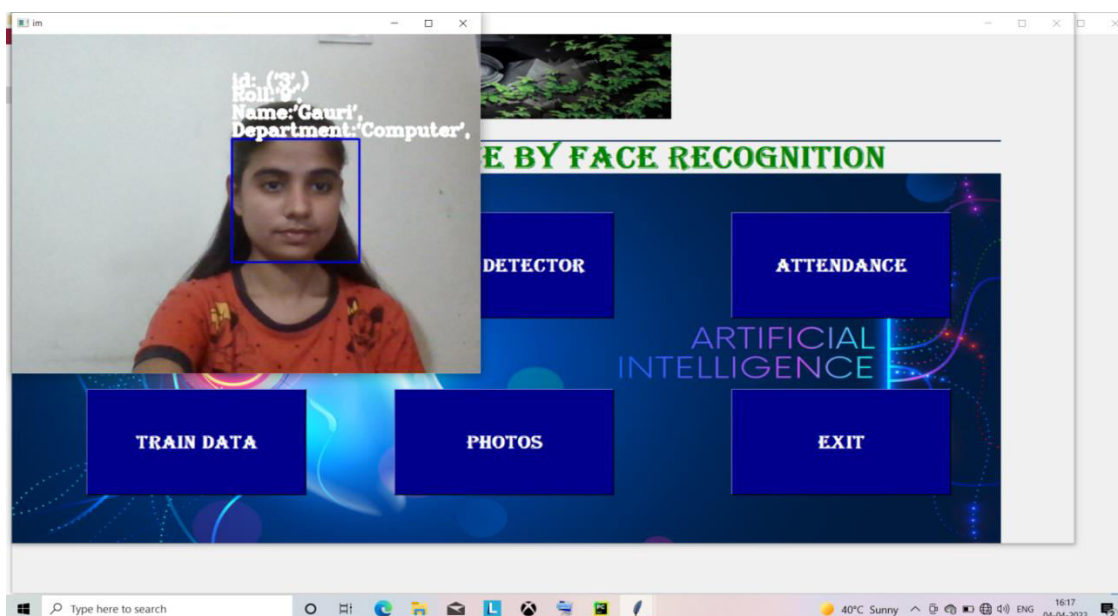
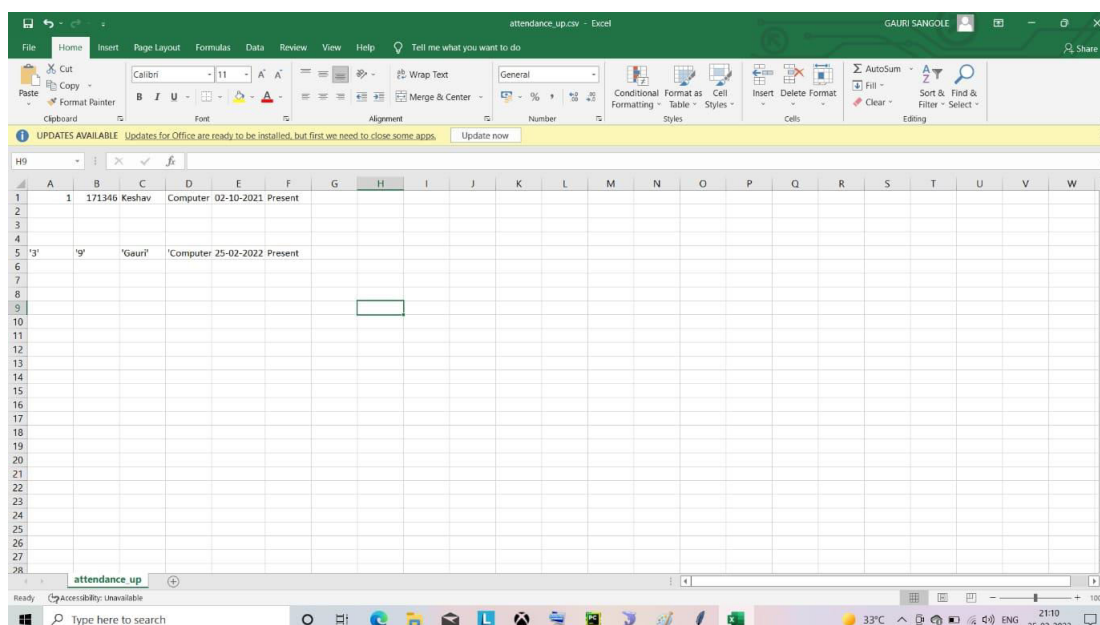


Fig.11: Attendance Using Id, Name, Roll No, Department



Roll No	Name	Department	Date	Status
171346	Keshav	Computer	02-10-2021	Present
9	Gauri	Computer	25-02-2022	Present

Fig.12: Attendance Shown In Excel Sheet

XVI. CONCLUSION

For student attendance, we have established an automatic attendance system using facial recognition. It saves time and effort, especially when there are a big number of students who have recorded their attendance. The Python programming language is used to implement the entire system. The main aim of developing student attendance system using facial recognition technique is to capture the real time attendance. We are creating this model Specifically, in exam-related difficulties such as who is attending and who is not attending.

XVII. FUTURE SCOPE

In the future work, we will developed more enhancing features in our automatic attendance system project. We improve our video quality for better image enhancement. We take a lot of images for creating more dataset for extracting the features. We improve picture's brightness for quickly identified images. We will using facial features for different applications like laptop unlocked by using facial recognition. Many government related application's uses facial features.

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A Study on the Impact of Covid-19 on the Cement Industry

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ABSTRACT

The cement industry is one of the most important industries needed for sustainable development. It can be considered the backbone of development. The year 2020 has been a year full of unprecedented changes and it would not be the most disruptive time in the cement industry. The industry predicted and prepared for a solid year early in the first quarter of 2020, however, with the COVID-19 epidemic, it is facing a sharp decline in production and demand, especially in developing countries where the Construction Industry is the backbone of the economy. The research methodology used in the study focuses on past, present, and future performance. The purpose of this paper is to study the factors and their impact on Cement Industry. Secondary data is used for the study. A Statistical Package for Social Sciences (SPSS-25) software is used to fulfill the objective of the study. Pearson Correlation is used to understand the relationship/correlation between the factors affecting in cement industry and the demand for cement. Regression Analysis is performed to understand the impact of various factors on cement sales. It is found that there is a very strong correlation between steel, coal, limestone, sand, bricks w.r.t. to cement sale. The researcher has applied Regression Analysis with those variables which have a positive correlation and it is found that coal and sand directly impact cement demand. The other external factor that has an impact on the cement industry is technological advancement, geographical advantages, economies of scale, seasonal demand, price, government projects, availability of raw materials, and economical factors.

Keywords: Covid-19, Cement industry, Construction Industry, demand forecasting

INTRODUCTION

As the outbreak of COVID-19 reduced production in many countries, the industry has observed low demand for its products, which leads to excessive energy. Cement companies are highly anticipated to survive this catastrophe, but they must strengthen their resilience and competitiveness. Companies must also reduce their carbon emissions so that they can operate longer; with cement industry produces 7 to 8 percent of greenhouse gas emissions, pressure grows so that the industry can achieve carbon neutrality. As operations at all production plants and construction sites have been halted by global closure to contain the spread of the virus, production and use of cement have dropped dramatically. Even in countries where construction was not excluded from the list of economic activities that were banned during the closure, economic downturn and weak consumer sentiment led to a reduction in cement reductions as we approach the end of the first quarter of 2020. The economic downturn due to business disruption in all industries will also lead to a decrease in the refill of order books, but it will recover slightly as the economy recovers.

Following figure 1 represents the sales trend of the top Indian Players in Cement Industry.

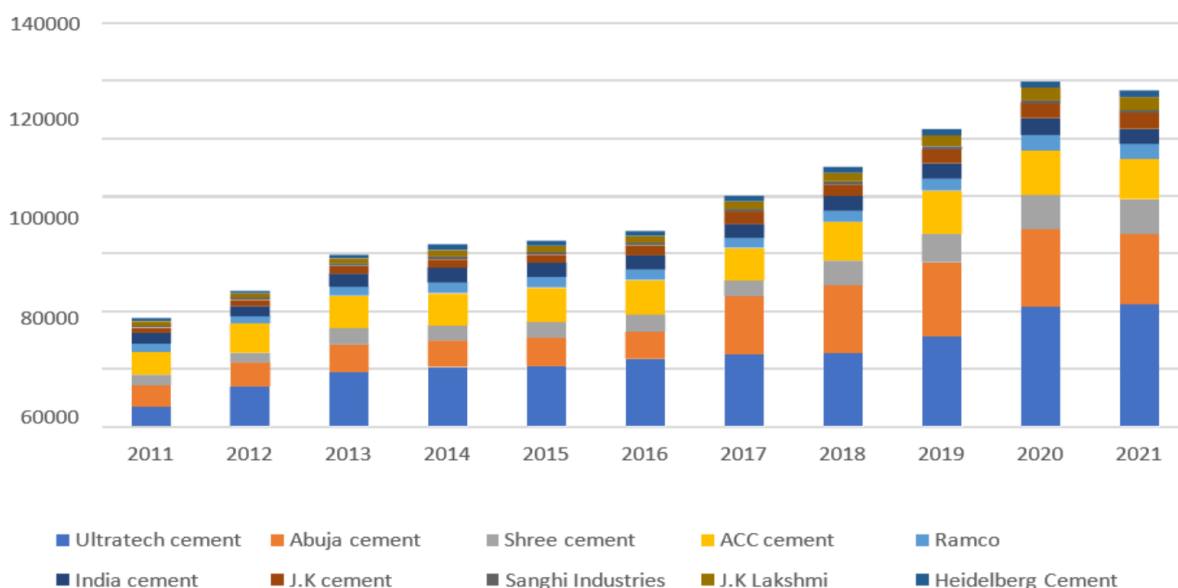


Fig. 1: Indian Players in Cement Industry – Sales

Sources - <https://www.moneycontrol.com/stocks/marketinfo/netsales/bse/cement.html>

Market Dynamics

Drivers: Increasing automation in public spaces and increasing awareness about antimicrobial materials - Public spaces will continue to evolve to accommodate the distribution of COVID-19. Designers will often choose anti-bacterial fabrics and finishes, including existing ones, such as copper, and they will definitely be improved. Certain building materials, already common in health care, may find use in other public areas, such as reducing the number of flat areas where germs can spread and installing ventilation systems that help remove polluted air from any area. The health care design, too, is likely to receive improvements in the near future. While community mitigation may seem necessary, it is reasonable to expect that concerns about future outbreaks may encourage architects to visualize open spaces that allow and encourage people to spread.

Restrictions: Fluctuations in the prices of raw materials - The immature materials and energy used in different types of construction have variable prices and are set to continue in the forecast period. A sudden increase or decrease in cost affects the end of the project and the profit margin for producers and contractors. The most widely used materials in the construction industry are cement, scales, sand, steel, aluminum, wood, glass, flooring materials, wall materials, and composite materials. The volatility of the energy and crude oil used in the production and transportation of these commodities is a major cause of fluctuations in the prices of these commodities. This volatility, in turn, results in price fluctuations for finished buildings. Uncertainty over the cost of fuel and the cost of crude oil may increase the price of crude material and increase the cost of raw materials used in previously distributed concrete. Therefore, the prices of these materials have a direct impact on the cost of precast concrete. In addition, with rising commodity costs, retailers are increasing the price of their products or lowering their profit margins, which will have a negative impact on market growth.

Residential is a major part of the construction industry - Globally, the construction industry is over USD 11 trillion, of which residential construction is the largest sector. The occurrence of COVID-19 has caused disruption in the housing sector. Significant disruption to the supply chain. The transformation of COVID-19 from a China-focused challenge to a global epidemic has led to a shift in impact on chains and construction markets around the world.

The ongoing epidemic has created many challenges not only for the construction industry but also for the global economy. The global crisis, the duration of the recession, and the resilience will largely determine the nature and magnitude of these challenges. The construction industry, especially the new residential sector, has been doing well and is seeing growth in many sectors by 2020. Due to the increase in the number of cases worldwide, many ongoing projects that were considered important by government officials were suspended, but new residence permits were suspended. In the past, builders and contractors struggled to obtain permits for new and refurbished projects. Currently, both construction companies and workers are resuming their operations. However, the new guidelines and regulations issued by governments have created uncertainty and confusion for companies and employees. Homeowners in areas with high COVID-19 cases limit access to contractors or housing and prefer DIY projects as families live at home.

Predictability plays a vital role development of future plans. It is important for the organizations to know a person's level of activity planning before investing in inputs. Predicting a measure of a future event that is systematically achieved integration and forwarding in a predetermined manner data about the past. To know the future need for the cement industry forecast is an important part.

REVIEW OF LITERATURE

- **Rajesh & Sekar (2017)**, in their study 'Demand and supply analysis on manufacturing of cement for Monsoon periods using Dvorak technique' stated that infrastructure and investment in building projects in India are growing clearly. During the rainy season, cement production has increased to meet their needs in non-rainy seasons. The tropical Cyclone monsoon has a profound effect on the cement-making process. The paper concluded that pre-monsoon and post-monsoon has got its own impact on industrial growth and Dvorak's methodologies and applications in satellite images for forecast analysis proved to be very effective.
- **Gardashova & Huseynov (2016)**, in their paper titled 'Cement Industry Overview and market price forecasting in Azerbaijan' explains that the state of the global economy and the prices of energy resources influence local economic trends, investment, the state of financial institutions, and the cement industry in Azerbaijan as a whole. These situations affect the need as well as the community of the cement businesses and their decisions. It concluded that financial resources, new big infrastructure projects, and stable demand are the essential conditions of this market.

- **Fradinata & Suthummanon (2019)**, studied ‘Comparing the forecasting method of artificial neural network and support vector regression model to measure the bullwhip effect in supply chain’ stated that the forecasting demands have Mean Squared Error (MSE) which is used to measure the bullwhip effect in the supply. The magnification of orders would influence the inventory in the supply chain. It is important to understand forecasting techniques and the bullwhip effect for the warehouse management to manage the inventory in the warehouse by the manager, especially in probabilistic demand of the customer. This process helps in determining the inventory policy for the retailer. Artificial Neural Network (ANN) and Support Vector Regression (SVR) are the two forecasting techniques used in the study. The study concluded that the ANN and SVR are the appropriate methods of data mining which can be flexible to use for forecasting method to predict the certain point in the dataset to manage the inventory in the warehouse.
- **Taiyiai (2018)**, in their paper titled ‘Supply chain innovation and forecasting accuracy in cement manufacturing firms in Kenya’ stated that supply chain innovation has become the base to gain a competitive advantage for any organization. Cement manufacturing firms are facing a management dilemma. Regression analysis was performed to understand the impact of Inventory by vendor managers on business performance. The result shows that a unit change in vendor manager’s inventory would lead to an increase in business performance by a factor of 0.23 and this can lead to growth in demand forecasting by 0.239. The paper concluded that the cement manufacturing firms contribute significantly to the growth of infrastructure hence there is a need for supply chain innovations and forecasting accuracy among the key stakeholders. The study also determined that the significant determinants of demand forecasting are VMI, collaborative planning, and cross-docking.
- **Deakshinamurthy (2017)**, in their paper studied ‘Demand forecasting for cement in India 2030’ and came up with the findings that demand for cement production is expected to increase at an exponentially increasing rate as compared to the rate at which the population is increasing. The result shows that the residential, commercial, and government projects are in very favorable condition and it is increasing simultaneously.
- **Uzzaman & Rahman (2016)** studied on ‘Simulation of cement Manufacturing Process and demand forecasting of cement Industry’ seasonality of demand is considered as the same demand repetition after a particular period. Using Holt-Winters Method, demand forecasting was applied and it was able to facilitate the comparison between the overall customer demand and the future forecasted demand. The paper concluded that Holt-Winter’s method is more appropriate than Holt method.

NEED/SCOPE OF THE STUDY

COVID-19 outbreak has slowed the construction and cement industry and lower demand for its products in India. Since the cement industry requires an extensive manufacturing process accurate demand forecasting has to be performed keeping in mind all the external factors including COVID which has a great impact on the industry.

OBJECTIVES OF THE STUDY

The Main Objective of the Study Was-

- To study the impact of COVID-19 on the Cement Industry.
- To understand the factors impacting the cement demand in India.
- To perform demand forecasting of cement and understand its demand in the upcoming future.

RESEARCH METHODOLOGY

The study is descriptive in nature. A statistical package for social science (SPSS) 25 was used for this purpose. The research methodology used in the study focuses on past, present, and future performance. Secondary data is used for the study. A Statistical Package for Social Sciences (SPSS-25) software is used to fulfill the objective of the study. Pearson Correlation is used to understand the relationship/correlation between the factors affecting in cement industry and the demand for cement. Regression Analysis is performed to understand the impact of various factors on cement sales. The researcher has applied Regression Analysis with those variables which have a positive correlation.

DATA ANALYSIS AND MAJOR FINDINGS

Trend analysis was performed to understand the trend of sales of top players of Cement Industry in India.-

The Following table 1 represents the sales record of 10 years of the top 5 Indian Players.

Year	Ultratech cement	ambuja cement	Shree cement	ACC cement	Ramco
2011	7016	7297	3543	8181	2795
2012	13,646	8489	3338	10153	2613
2013	18,551	9749	5641	11275	3254
2014	20,514	9161	5418	11062	3831
2015	20,730	9955	5715	11646	3684
2016	23,306	9437	6259	11706	3645
2017	25,153	20094	5514	10990	3573
2018	25,375	23609	8594	13285	3950
2019	30,979	26041	9826	14802	4406
2020	41,462	27104	11722	15658	5146
2021	42,430	24516	11904	13786	5368

Table 1: Sales record of Top 5 Indian Companies

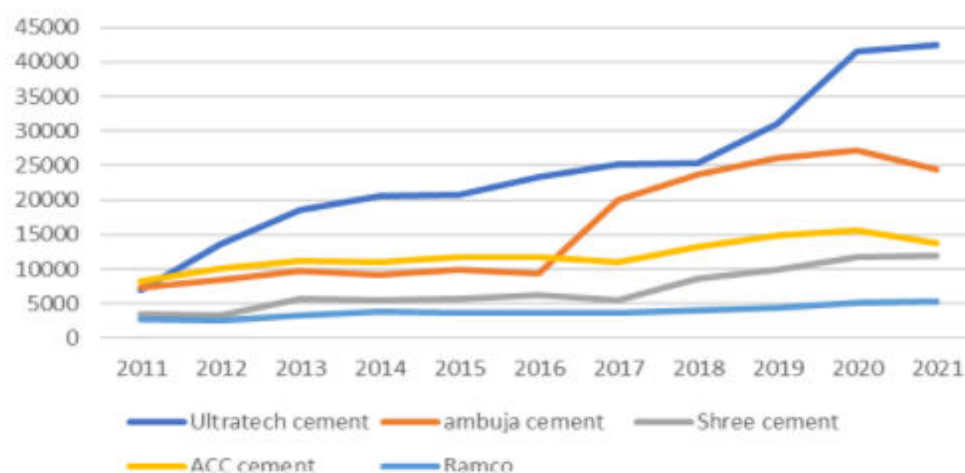


Fig. 2: Indian Cement Industry Sales Record – FY2011-2021

Sources: <https://www.moneycontrol.com/stocks/marketinfo/netsales/bse/cement.html>

From the above Fig. 2, we can analyze the trend of the sales of the top 5 players in the Cement Industry in India. Ultratech is the dominating player in the decade. While Ambuja and ACC were initially in the same demand till 2016 but there was a hike in sales of Ambuja Cement demand from 2016 to 2021. From the overall analysis, the demand for cement rises in 2016 because of the many new government projects and growth in Infrastructural projects. The impact of Covid can be clearly seen in 2020 and there was a decrease in demand from 2020.

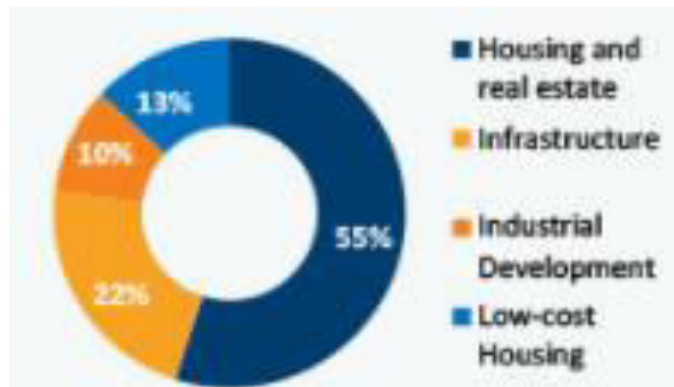


Fig. 3: Cement Demand in FY21

Sources - <https://www.ibef.org/uploads/industry/Infographics/large/Cement-Infographic-November-2021.pdf>

The above-mentioned Fig. 3 shows the cement demand in FY21 sector-wise where Housing and real estate covers 55% of the total demand. This can help in forecasting the demand sector-wise keeping in mind the impacts of various external factors and COVID-19.

The prices and demand of various building materials have direct impact on the demand of cement. To understand the correlation of various building with respect to cement sales correlation analysis was performed. The demand and consumption data of various building materials were taken into consideration for the study.

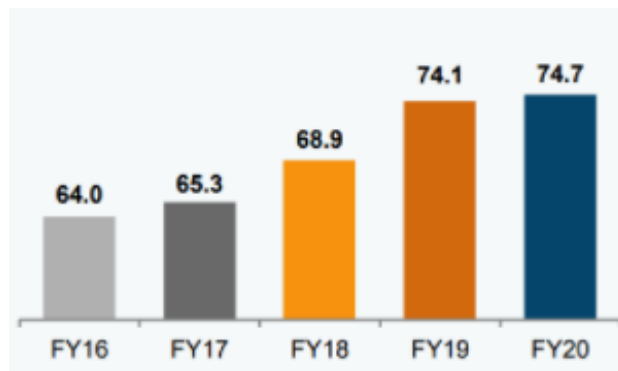


Fig. 4: Demand of Steels (in Kg)

Sources - <https://www.ibef.org/uploads/industry/Infographics/Large/Steel-Infographic-November-2021.pdf>

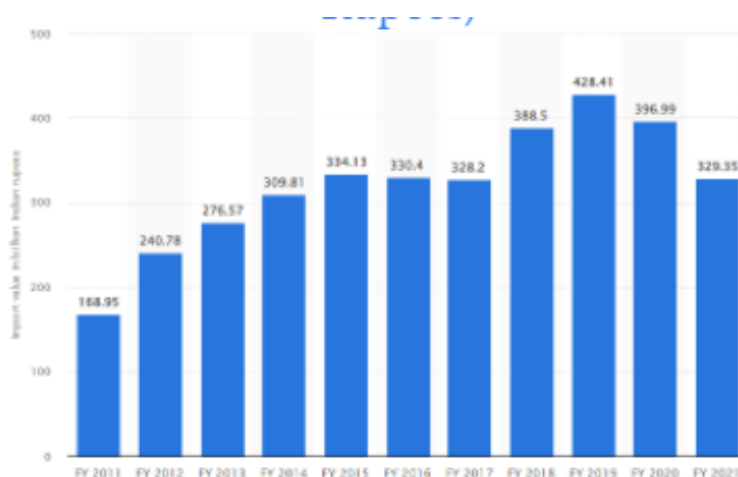


Fig. 5: Demand of woods (Billion INR)

Sources - <https://www.statista.com/statistics/625460/import-value-of-wood-india/>

Similarly, the Demand of Coal, Steel, limestone, Sand and Bricks was considered and correlation was performed.

Allied Building Materials	Correlation Value
Coal	+0.852
Steel	+0.231
Limestone	+0.700
Sand	+0.422
Bricks	+0.050

Table 2: Pearson Correlation Value of Allied Building Materials w.r.t. Cement Sales

From the above Table 2, we can interpret that there was a positive correlation of cement demand with all the allied building materials that were considered for the study. Coal has a very strong positive correlation with cement sales. If there is any impact or rise in price or demand it will proportionally impact the cement demand in India. Coal and Limestone has strong positive correlation with cement demand while Sand has a moderate correlation with cement sales. Bricks and steel have weak positive correlation with cement sales

Regression Analysis

Regression analysis was performed to understand and find out the exact impact per unit on Cement demand and consumption.

$$\text{Regression Equation} - y = 0.523x_1 + 0.005x_2 + 0.323x_3 + 0.01x_4$$

In the above Regression Equation,

X1 = Impact of Coal demand on Cement

X2 = Impact of steel demand on Cement

X3 = Impact of limestone demand on Cement.

X4 = Impact of Glass on Cement demand.

The above-mentioned four allied building materials were the ones that had a strong and moderate correlation with Cement Demand. Therefore, these building materials were considered for performing the Regression analysis. The above-mentioned Regression equation can be interpreted as if the demand of coal is increased by 1 unit it will impact the cement demand by 0.852 factor. Similarly, if the Limestone demand is increased by 1 unit it will have a direct impact of 0.700. All the four allied building materials have a positive impact on Cement Demand.

Demand Forecasting

Exponential Smoothing method and moving average method was performed to forecast the demand for the upcoming years. There are many Advanced AI based Demand forecasting techniques which can be applied for the study.

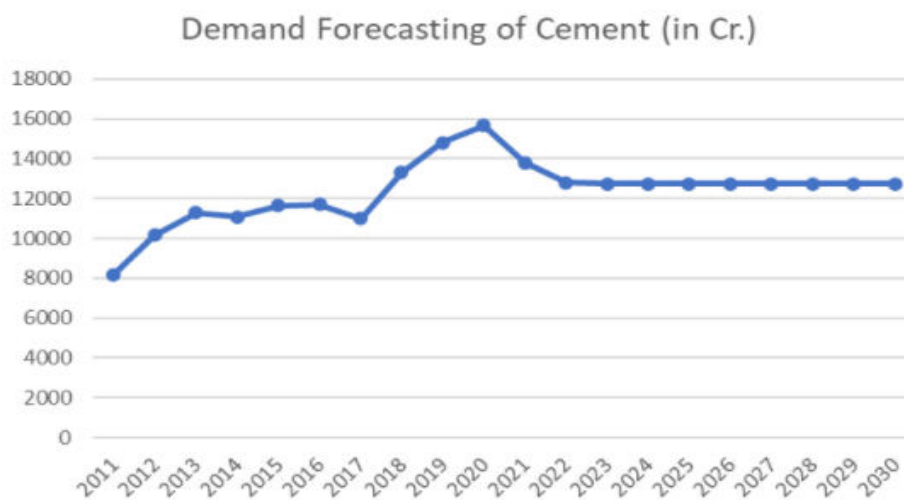


Fig. 6: Demand Forecasting – Exponential Smoothing Method

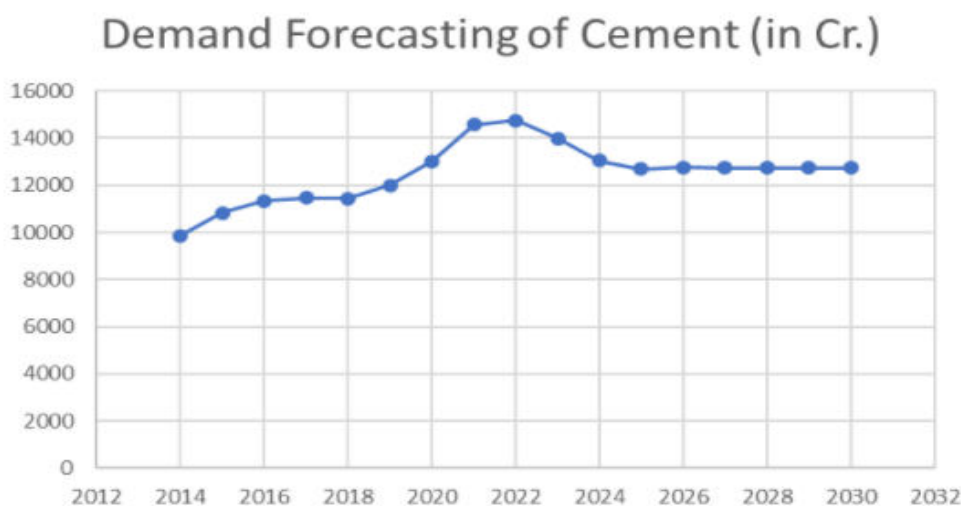


Fig. 7: Demand Forecasting – Moving Average Method

Both the above charts show the Demand forecasting of cement in Cr till FY2030. They clearly indicate that from the year 2020 there is a decrease in the demand for cement and can be the same for a few years in the upcoming future.

CONCLUSION AND LIMITATION

Cement manufacturing industries depend on government policies and principles. Infrastructure and construction projects are growing in India. Pre- and post-demonetization affected the cement industry's growth very badly. Similarly, Pre and post covid conditions also have a huge impact on the industry. The government should take remedial measures to stop such declining growth of the cement Industry. Cement manufacturing firms must add more resources to innovations to gain a competitive advantage. They should also put more resources in terms of finance for research and development of the Market.

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Spectroscopic Characterization Charge Analysis and Molecular Docking Profiles of Using A Quantum Computational Method

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ABSTRACT

The optimized molecular structure and corresponding vibrational assignments of 3-chloro-4-methylanisole (CMA) have been investigated using Density Functional Theory (DFT)/B3LYP with 6-31 +G (d, p) and 6-311++G (d, p) basis sets. Making use of the recorded data, the complete vibrational assignments are made and analysis of the observed fundamental bands of molecule is carried out. The Mulliken charge analysis and the chemical reactivity and hardness of the molecule in terms of HOMO-LUMO energy gap have been implemented in terms of reactivity parameters. The MEP analysis was utilized for predicting the electrophilic and nucleophilic site in the CMA molecule. The biological activity of the CMA molecule were studied by using molecular docking analysis to identify hydrogen bond length and binding energies with different cancer protein. The CMA compound has been screened and found to exhibit anti-bacterial activity.

INTRODUCTION

Anisole and its derivatives are used as a precursor for other synthetic compounds, solvents in perfumery; insect pheromones and pharmaceuticals [1-2]. The functional groups present in anisole lead to the variation of charge distribution in the molecule and consequently affect the structural, electronic and vibrational parameters. The enhanced nucleophilicity of anisole versus benzene reflects the influence of the methoxy group, which renders the ring more electron-rich[3]. The heterocyclic compounds are those cyclic compounds whose ring contains one or more atoms of other elements besides carbon atoms. Because of the wide variety of physiological activities associated with the heterocyclic compounds, Many Anisole derivatives are well known for their high and diverse biological activities including antibacterial, antifungal, antiviral, pharmaceutical and agrochemical agents [4-5]. The high electro negativity of halogens particularly (chlorine)in the aromatic part of the drug molecules plays an important role in enhancing their biological activity, This paper put forth the spectroscopic (FT-IR, FT-Raman,¹H NMR and ¹³C NMR) features and biological docking behaviours of methyl anisole derivatives. Furthermore, physicochemical properties and chemical reactivity of the molecules were defined based on the analysis of molecular electrostatic potential surface, non-covalent interactions and non-linear optical properties. Enzyme binding activity and docking behaviour of CMA were tested on a model enzyme structure of binding ligands. It is also possible to combine the spectroscopic and molecular docking analysis to identify the biological importance of methyl anisole derivatives. The DFT calculations were carried out by Gaussian 09 [6] and visualized with Gauss view programme. The molecule PED assignments, HOMO-LUMO, MEP and Mulliken charges were calculated through DFT studies. The pharmacological activity of a molecule depends on its geometric parameters and intermolecular interactions [7].

EXPERIMENTAL DETAILS

The sample of 3-Chloro-4-Methylanisole (CMA) is purchased from Sigma–Aldrich Chemicals, which is of spectroscopic grade and hence used for recording the spectra as such without any further purification. The FT-IR spectrum of the above compound is recorded in Bruker IFS 66V spectrometer in the range of 4000–400 cm^{-1} . The spectral resolution is $\pm 1 \text{ cm}^{-1}$. The FT-Raman spectrum of the above compound is recorded in Bruker IFS Raman module equipped with Nd: YAG laser source operating at 1.064 μm line width with 200 mW power. The FT-Raman spectrum is recorded in the range of 4000–100 cm^{-1} with a scanning speed of 30 $\text{cm}^{-1} \text{ min}^{-1}$ and spectral width 2 cm^{-1} . The frequencies of all sharp bands are accurate to $\pm 4 \text{ cm}^{-1}$.

QUANTUM CHEMICAL METHODS

The quantum mechanical calculations have been carried out by using the Gaussian 09W program package. The optimized structure and vibrational frequencies of CMA compound has been calculated by using DFT/B3LYP method with 6-311++G (d, p) basis set [8-9]. All computational calculations have been executed by adding polarization function d and diffuse function p on heavy atoms and also with triple split valence basis set for better reliable results. The Mulliken charge distribution of the present molecule is mapped and their values predict the pharmaceutical uses of the molecule. The electronic properties such as HOMO-LUMO analysis, global hardness, chemical potential, electro negativity have been used to elucidate information regarding charge transfer and chemical reactivity of the molecule. The auto dock program [10] was used for the molecular docking study.

RESULTS AND DISCUSSION

Structural Analysis

The molecular structure contains one benzene ring with chloro and methyl anisole. It was carried out using B3LYP/ 6-311++G (d, p) basis set, the parameters such as bond lengths and bond angles and dihedral angles are presented in the Table.1. The optimal picture of the structural compound is shown in Fig.1.

Table.1: Optimized Geometrical parameters of 3-Chloro-4-Methylanisole using B3LYP/6-311++G (d, p) method and basis set

Bond length (Å)			Bond Angle (°)			Dihedral angle (°)		
C1-C2	1.395	1.395	C2-C1-C6	123.2	123.2	C2-C1-C6-C11	-180.0	-180.0
C1-C6	1.394	1.394	C2-C1-C115	117.19	117.1	C115-C1-C6-C5	-180.0	-180.0
C1-C115	1.766	1.766	C6-C1-C115	119.5	119.5	C115-C1-C6-11	-0.001	-0.001
C2-C3	1.395	1.395	C1-C2-C3	118.9	118.9	C1-C2-C3-C4	0.0007	0.0008
C2-H7	1.080	1.081	C1-C2-H7	119.1	119.1	C1-C2-C3-O10	-180.0	-180.0
C3-C4	1.398	1.398	C3-C2-H7	121.8	121.8	H7-C2-C3-C4	180.0	-179.9
C3-O10	1.363	1.363	C2-C3-C4	119.4	119.4	H7-C2-C3-O10	0.001	0.0014
C4-C5	1.385	1.385	C2-C3-O10	124.2	124.2	C2-C3-C4-C5	-0.0007	-0.0008
C4-H8	1.082	1.082	C4-C3-O10	116.2	116.2	C2-C3-C4-H8	179.9	179.9
C5-C6	1.403	1.403	C3-C4-C5	119.8	119.8	O10-C3-C4-C5	-180	-180
C5-H9	1.084	1.084	C3-C4-H8	118.8	118.8	O10-C3-C4-H8	-0.0003	-0.0003
C6-C11	1.506	1.506	C5-C4-H8	121.3	121.2	C2-C3-O10-16	0.001	0.002
O10-C16	1.421	1.421	C4-C5-C6	122.5	122.5	C4-C3-O10-16	-180	180.0
C11-H12	1.093	1.093	C4-C5-H9	118.9	118.9	C3-C4-C5-C6	-0.0001	-0.0002
C11-H13	1.093	1.093	C6-C5-H9	118.4	118.4	C3-C4-C5-H9	180.0	180.0
C11-H14	1.091	1.091	C1-C6-C5	115.8	115.8	H8-C4-C5-C6	180.0	-179.9
C16-H17	1.088	1.088	C1-C6-C11	122.8	122.8	H8-C4-C5-H9	0.001	0.001
C16-H18	1.095	1.095	C5-C6-C11	121.2	121.2	C4-C5-C6-C1	0.001	0.001
C16-H19	1.095	1.095	C3-O10-C16	118.6	118.6	C4-C5-C6-C11	-179.9	-179.9
			C6-C11-H12	111.5	111.5	H9-C5-C6-C1	-180	-180
			C6-C11-H13	111.5	111.5	H9-C5-C6-C11	0.001	0.0008
			C6-C11-H14	110.4	110.4	C1-C6-C11-12	-59.70	-59.6
			H12-C11-H13	106.8	106.8	C1-C6-C11-13	59.71	59.7
			H12-C11-H14	108.1	108.1	C1-C6-C11-14	180.0	180.0
			H13-C11-H14	108.1	108.1	C5-C6-C11-12	120.2	120.3
			O10-C16-H17	105.8	105.8	C5-C6-C11-13	-120.2	-120.2
			O10-C16-H18	111.3	111.3	C5-C6-C11-14	0.0026	0.004
			O10-C16-H19	111.3	111.4	C3-O10-C16-H17	180.0	-180
			H17-C16-H18	109.3	109.3	C3-O10-C16-H18	-61.2	-61.2
			C17-C16-H19	109.3	109.3	C3-O10-C16-H19	61.29	61.29

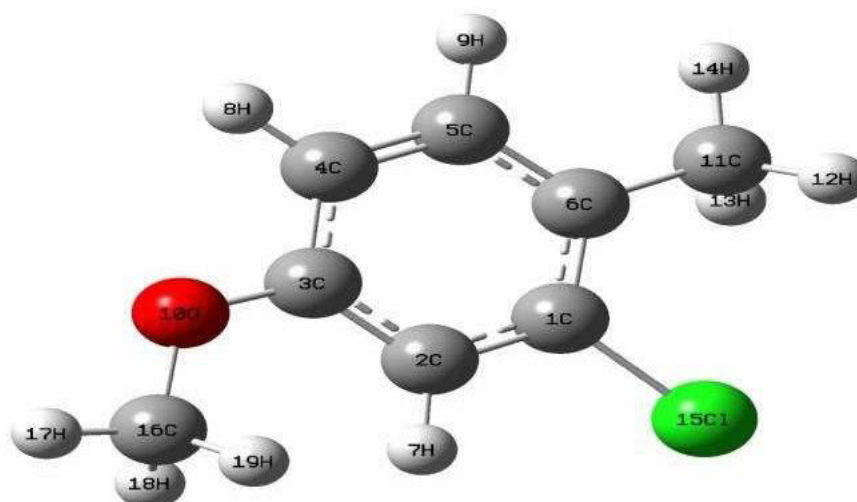


Fig .1: Optimized molecular structure of 3-Chloro-4-Methylanisole with numbering scheme

The bond length for C-C single bond is expected to be around 1.45 Å and that of C-C double bond around 1.34 Å [11]. The bond length for C-C in the benzene ring is observed between 1.38 Å to 1.40 Å. This shows that the bonds present inside the benzene ring are neither double bond nor single bond and all the bonds have some intermediate values, which is in agreement with earlier work on benzene derivative [12], this may be due to the conjugation of the electrons inside the benzene ring which leads to almost equal distribution of electron density between the double and single bonds. The bond length for C5-C6 is observed to be 1.40 Å. These slight increases in bond length may be due to the presence of the methyl group at C6 respectively. When the CO bonds in the molecule are compared, it is found that the O10-C16 bond length is 1.42 Å. This bond is present outside the ring, hence the influence on these bond lengths may not be significant. The C1-C15 bond length shows 1.76 Å. This shows that the bonds lie in the expected range.

Most elongated angles are C2-C1-C6 and C2-C3-O10 ranges are 123.2° and 124.2°, the unevenness in the angle is mainly due to the uneven distribution of charges around the carbon atoms in the ring, which is influenced by the presence of oxygen atom inside the ring. The hybridization of these carbon atoms are greatly changed and hence the angles. Remains bond dihedral angles are uneven range due to the presence of O and Cl atoms. All the dihedral angles of the title compound are either nearly to 0 to 180° which shows its planer nature.

The variation in bond angle depends on the electro negativity of the central atom, the presence of lone pair of electrons, and the conjugation of the double bonds. Bond order is a useful tool for characterizing bond type and measuring bond strength. The objective of the vibrational analysis is to obtain the vibrational modes connected with molecular structure of the compound under investigation. The harmonic vibrational analysis carried out for the optimized geometry.

Spectral Analysis

The vibrational assignments were done on the recorded FT-IR and FT-Raman spectra based on theoretically predicted wave numbers by DFT (B3LYP) level using 6-311+G (d,p) and 6-311++G (d,p) basis sets and are listed in Table.2 with their TED. Experimental Infrared and Raman spectra are shown in Fig.2 and Fig.3 respectively.

Table.2: Vibrational assignments of experimental frequencies along with calculated frequencies of 3-chloro-4-methylanisole using B3LYP/6311++G (d, p) and B3LYP/ 6-311+G (d, p) basis set

S. No	Symmetry C1	Experimental Frequency (cm ⁻¹)		Theoretical Frequency				Assignment s with TED (%)
				B3LYP/ 6-311++G (d, p) cm ⁻¹		B3LYP/ 6-311+G (d, p) cm ⁻¹		
		FT-IR	FT- Raman	Unscaled	Scaled	Unscaled	Scaled	
1.	A	-	3180	3223	3184	3220	3178	v CH(98)
2.	A	-	3070	3197	3075	3192	3072	v CH(97)
3.	A	3060	-	3166	3066	3160	3064	v CH(98)
4.	A	-	3040	3135	3050	3130	3038	CH3ss(92)
5.	A	3002	3002	3107	3028	3100	3020	CH3ss(92)
6.	A	2951	-	3078	2960	3070	2955	CH3ips(94)
7.	A	-	2926	3064	2940	3060	2935	CH3ips(94)
8.	A	2836	2836	3029	2850	3024	2845	CH3ops(90)
9.	A	-	2820	3005	2830	2998	2825	CH3ops(90)
10.	A	-	1680	1647	1682	1640	1680	γ CC(88)
11.	A	-	1620	1600	1625	1596	1610	γ CC(88)
12.	A	1609	1609	1527	1611	1520	1598	γ CC(88)
13.	A	1578	1580	1505	1582	1500	1578	γ CC(89)
14.	A	-	1540	1495	1544	1491	1540	γ CC(88)
15.	A	1497	-	1492	1499	1490	1490	γ CC(88)
16.	A	1462	-	1482	1465	1476	1460	γ CC(89)
17.	A	-	1452	1472	1465	1467	1454	CH3ipb(83)
18.	A	1441	-	1424	1446	1420	1440	CH3sb(84)
19.	A	1382	1384	1418	1388	1415	1380	CH3sb(84)
20.	A	-	1320	1329	1325	1325	1320	b CH(70)
21.	A	1298	1298	1298	1300	1293	1295	γ CO(82)
22.	A	1280	-	1268	1285	1264	1282	b CH(70)

23.	A	-	1245	1228	1250	1220	1243	b CH(74)
24.	A	-	1210	1202	1212	1118	1205	b CH(74)
25.	A	1201	-	1167	1205	1166	1204	R trigd(72)
26.	A	1183	1184	1160	1185	1154	1185	R asym(70)
27.	A	-	1160	1062	1163	1055	1164	R symd(68)
28.	A	1151	-	1058	1154	1052	1153	b CC(72)
29.	A	1110	-	1052	1112	1045	1110	CH3opb(83)
30.	A	1047	-	1012	1050	1009	1045	CH3opb(83)
31.	A	-	1040	956	1044	950	1049	ω CH(56)
32.	A	995	-	890	999	885	992	ω CH(56)
33.	A	-	940	844	948	840	938	ω CH(56)
34.	A	877	878	823	880	815	875	b CO(54)
35.	A	840	-	751	842	750	838	CH3ipr(75)
36.	A	804	-	701	807	699	798	CH3ipr(75)
37.	A	744	743	693	748	690	746	ω CC(54)
38.	A	692	690	591	695	585	689	tR asym(72)
39.	A	660	-	540	664	535	662	tR sym(70)
40.	A	-	620	457	624	452	620	tR asym(71)
41.	A	587	-	454	590	450	585	γ CCl (86)
42.	A	552	-	434	555	432	549	CH3opr(76)
43.	A	-	540	352	544	345	539	CH3opr(76)
44.	A	-	474	334	477	330	470	ω CO(54)
45.	A	448	441	257	450	250	445	b CCl(64)
46.	A	-	343	242	347	241	343	tCH3(59)
47.	A	-	198	184	202	180	200	ω CCl (58)
48.	A	-	73	175	78	167	73	v CH3(59)

Abbreviation: v- stretching; b - bending; symd – symmetric deformation; asymd - asymmetric deformation; trigd- trigonal deformation; δ -out of plane bending; t– torsion; twist-twisting.

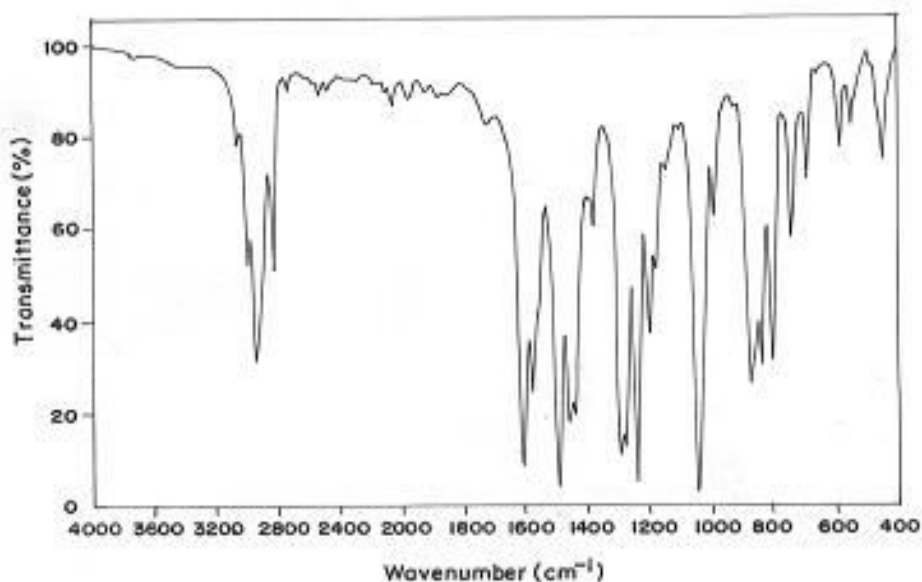


Fig.2: FTIR spectrum of 3-Chloro-4-Methylanisole

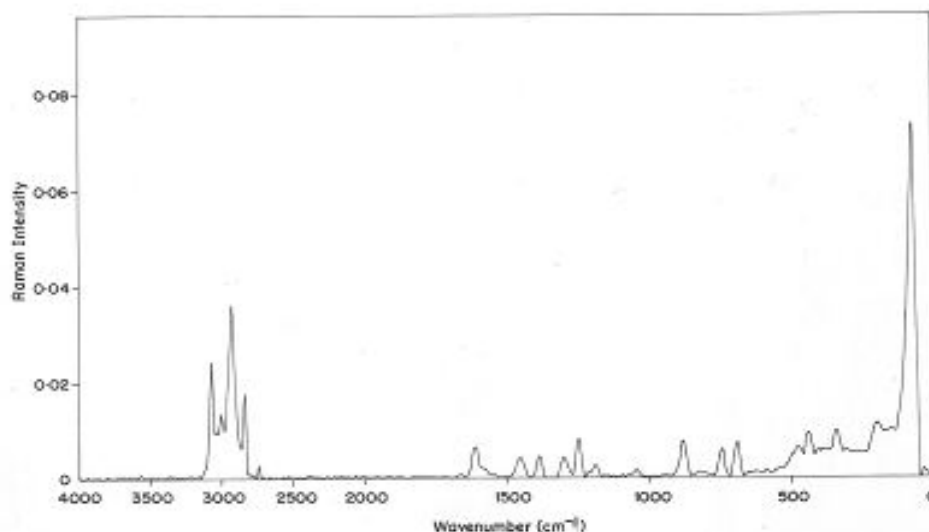


Fig .3: FT-Raman spectrum of 3-Chloro-4-Methylanisole

The vibrational analysis obtained for CMA with the unscaled B3LYP/6-311+G(d,p) force field are generally greater than the experimental values due to neglect of anharmonicity in real system. Due to this reason, a discrepancies arises between observed and calculated vibrational wavenumbers in order to correct this, it is essential to scale down the theoretically calculated harmonic frequencies by introducing a scaled field or directly scaling the calculated wavenumbers with proper scale factor.

C-H Vibrations

Generally, all the aromatic C–H stretching vibrations of the benzene ring are normally expected between 3100–3000 cm^{-1} [13], which show the uniqueness of the skeletal vibrations. The present molecule CMA has three CH stretching vibrations. All three vibrations are found within the expected region, with values 3180, 3070, and 3060 cm^{-1} . All three bands are well within the expected range which confirms the fact that these are not affected by the substitution groups, as seen in previous analyses. All the modes are confirmed by their TED values.

Similarly, the C–H in-plane bending vibrations for aromatic molecule occur as strong to medium intensity bands in the region 1300-1000 cm^{-1} [14]. In the present case, the CH in-plane bending bands are observed at 1441 cm^{-1} in FT-IR and 1452 cm^{-1} in FT-Raman.

The calibrated values of CH bending vibrations are found at 1280, 1245, and 1210 cm^{-1} . Almost all the vibrations are found near the expected range. The C–H out-of-plane bending vibrations are expected in the region 1000–750 cm^{-1} [15]. The vibrations are found at 943-812 cm^{-1} in the present case. The experimental values, 1110 and 1047 cm^{-1} in FT-IR are exhibited. All these CH vibrations are found in the expected range and the vibrations of the functional group have not been affected by other vibrations.

CH₃ Vibrations

Methyl group attached along with methyl anisole and oxygen atom to a benzene ring. Methyl group vibrations are electron-donating substituents and can vibrate in different ways viz., CH₃ symmetric and asymmetric stretching, bending modes, and torsion. Methyl CH stretching mode appears at lower frequencies than those aromatic rings at 3000-2900 cm^{-1} . The anti-symmetric and symmetric deformations of the methyl group attributed in the region 1465-1440 cm^{-1} and 1040-900 cm^{-1} respectively [16]. The observed band of the CH₃ stretching is found in FT-IR at 3002 cm^{-1} and in FT-Raman at 3040 and 3002 cm^{-1} respectively. This model is confirmed by the TED value. The in-plane bending vibration is observed at 1441, 1382 cm^{-1} in FT-IR and 1452, 1384, 1320 in FT- Raman spectrum. The out-of-plane bending vibration is found at 812-583 cm^{-1} [17]. All these CH₃ vibrations are lying in the expected range which shows they are not affected by other modes.

C-C Vibrations

The C=C and C-C stretching vibrations present in benzene are usually assigned in the region 1600-1500 cm^{-1} and 1500-1400 cm^{-1} respectively [18], though they are not distinctly present inside the ring. In the present case, the CC single and double bonds are observed at 1609 and 1578 cm^{-1} in FT-IR respectively. The above conclusions are in very good agreement with the expected range. This is much important in the spectrum of the present molecule.

All the modes are confirmed by their TED values. The last two bands corresponding to CC single bond stretching are found to be relatively less, these are due to the mixing of the CH in-plane and CO stretching modes which also lie in this region. As an overall conclusion about CC vibrations, they are very well within the expected region hence they are not affected by the substitution groups, as CH skeletal vibrations.

C=O Vibrations

In this present investigation, the C=O stretching is obtained at 1298 cm^{-1} in both FTIR and FT-Raman spectrum. Hence, no such asymmetric and symmetric splitting is present in this molecule. The deformation mode of C=O is expected in the regions, 625 cm^{-1} and 540 cm^{-1} [19]. In this molecule, the deformation mode of C=O is represented in FT-IR having a value of 877 cm^{-1} and 878 cm^{-1} FT-Raman. Both the CO deformation mode and the bending CC mode of vibration are assigned the same value. All the modes are confirmed by their TED values.

C-Cl Vibrations

The title compound contains one Cl atom, which means it is capable to stimulate one C-Cl stretching vibration. The C-Cl vibrations are expected in the region of $850\text{-}550\text{ cm}^{-1}$ [20] and experimentally C-Cl vibrations are observed at 587 cm^{-1} . In stretching and bending regions are lies in the expected range.

Mulliken Analysis

Mulliken atomic charge calculations play an vital role in the application of quantum chemical calculations in molecular system. The atomic charges affects dipole moment, electronic structure and polarizability of the molecular system. The graphical representation of the total atomic charges of CMA were obtained by DFT with 6-311++G (d,p) basis set shown in Fig.4. In the present investigation, CMA have a benzene ring, its C_6 gets a maximum positive value of 0.764, and similarly C_3 also maximum negative range of -0.824.

If the charge distribution is also symmetrical within the benzene ring, all the carbon atoms within the benzene ring can also be equally negative, but the structural analysis revealed that there is no conjugation of electrons within the benzene ring, as they can share the electrons form the attached O atoms outside the ring [21]. The carbon atoms C1 (0.31), C8 (0.764) are positive. Considering the electron withdrawing capacity of the oxygen atoms relative to carbon and hydrogen, the charge predicted by Mulliken charge.

Table.3: The Calculated Mulliken atomic charges of 3-Chloro-4-Methylanisole

Atoms	Mulliken charges (a.u.) B3LYP/6-311++G (d,p)
C1	0.317
C2	-0.447
C3	-0.824
C4	-0.142
C5	-0.454
C6	0.764
H7	0.195
H8	0.192
H9	0.131
O10	-0.154
C11	-0.811
H12	0.162
H13	0.162
H14	0.147
Cl15	0.606
C16	-0.336
H17	0.177
H18	0.156
H19	0.156

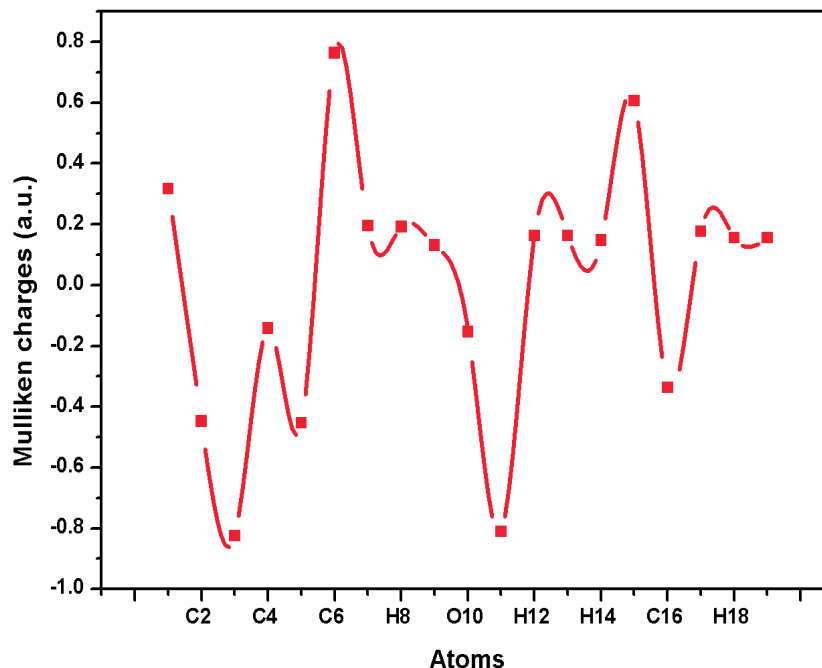


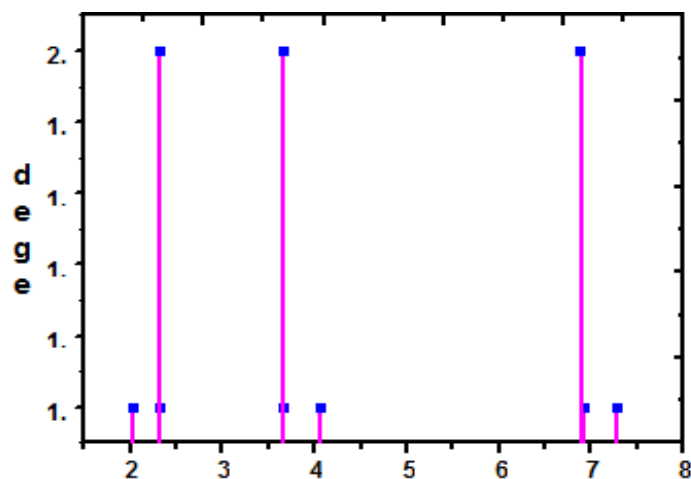
Fig.4: The graphical representation of Mulliken charges for different atoms of 3-Chloro-4-Methylanisole

NMR Analysis

NMR spectroscopy has proved to be an exceptional tool to elucidate the structure and molecular conformations. To provide an explicit assignment and analysis of ^{13}C and ^1H NMR spectra, the theoretical chemical shift of the title compound is determined. The computational shifts were determined using gauge independent atomic orbitals (GIAO) functional along with B3LYP/6-311++G (2d,p) combination, the calculations were performed both in gas as well as in acetone solvent phases. The theoretical ^1H and ^{13}C NMR chemical shift values are presented in Table.4. and the corresponding spectra are presented in Fig.5 respectively. The phenyl carbon C1 atom is 148.4 ppm. It has the maximum chemical shift due to the attached Chlorine atom. The C11 and C16 are less deshielded 20.1 and 55.1 ppm. But these values are found higher than the literature where the values are methyl are much shielded having values of 10 ppm [22]. In the case of the molecule, all the carbon atoms have almost the same shift between the range (113.9) to (165.3) ppm in the acetone method. The 3C atom has the maximum chemical shift of 165.3 ppm, the next value is 136.0 and 134.2 ppm for C5 and C6, which agrees with the high negative charge of these two atoms as discussed in the Mulliken analysis due to the presence of chlorine atom within the ring. Hydrogen atoms are almost localized on the periphery of the compound and their chemical shifts are not expected to be affected by the chemical environment [23], ^1H NMR chemical shift for H7, H8, H9 which are in the benzene ring are found to be 6.8, 6.9, 7.2 ppm. These are in the expected range for aromatic hydrogen. But the hydrogen in the methyl anisole group is expected in the range 3 to 4 ppm as they are in the aliphatic chain.

Table.4: The Calculated ^{13}C NMR and ^1H Chemical Shifts (ppm) for 3-Chloro-4-Methylanisole Computed at B3LYP/6-311++G (2d, p) GIAO

Atom	Gas	Acetone	Atom	Gas	Acetone
13 Carbon			1 Hydrogen		
1C	149.3	148.4	7H	6.6	6.8
2C	113.2	113.9	8H	6.8	6.9
3C	165.3	165.3	9H	7.0	7.2
4C	119.9	119.9	12H	2.3	2.3
5C	135.7	136.0	13H	2.3	2.3
6C	133.5	134.2	14H	1.8	2.0
11C	20.5	20.1	17H	3.9	4.0
16C	54.5	55.1	18H	3.5	3.6
			19H	3.5	3.6



Chemical Shift (Ppm)

Fig. 5(a): ¹³C NMR Chemical Shifts (ppm) for 3-Chloro-4-Methylanisole

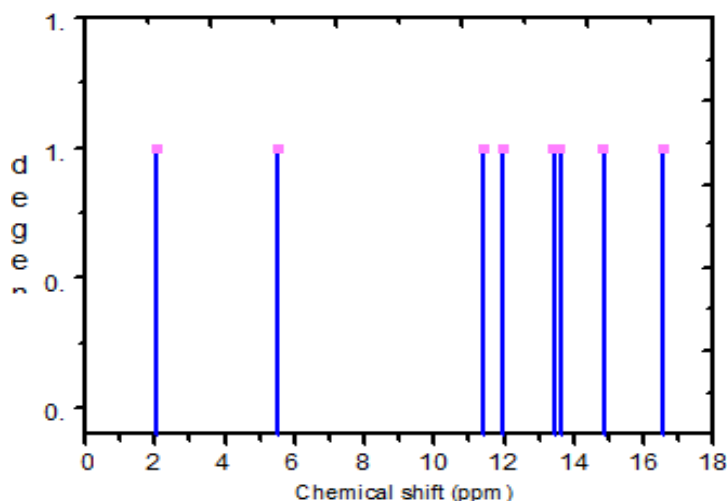


Fig. 5(b): ¹H Chemical Shifts (ppm) for 3-Chloro-4-Methylanisole

CHEMICAL REACTIVITY ANALYSIS

The properties which are evaluated using energies of HOMO and LUMO are the most essential in reactivity analysis, particularly in the spot of molecular synthesis and biomedical areas [24-25]. In this present investigation, the orbital energy gap (ΔE), HOMO and LUMO orbital energies and other important molecular reactivity parameters were evaluated by DFT/ B3LYP 6-311++G(d,p) level and the corresponding results were reported in Table.5.

Generally, the energy difference of HOMO to LUMO is known as energy gap which elucidates the stability of molecular structure [26]. The global reactivity parameters of the title compound such as chemical potential, electro negativity, global hardness, softness and electrophilicity index can be determined by using HOMO and LUMO orbital energies of the molecule. These reactivity descriptors data of the present compound CMA can be evaluated by the following equations.

$$\text{Ionization potential } I = -E_{\text{HOMO}}$$

$$\text{Electron affinity } A = -E_{\text{LUMO}}$$

$$\text{Chemical potential } \mu = -\left(\frac{I+A}{2}\right)$$

$$\text{Global hardness } \eta = \left(\frac{I-A}{2}\right)$$

$$\text{Electro negativity } \chi = \left(\frac{I+A}{2}\right)$$

$$\text{Softness } S = \frac{1}{\eta}$$

$$\text{Global electrophilicity index } \omega = \frac{\mu^2}{2\eta}$$

As seen in Table.5, The ionization potential and electron affinity of the molecule indicate the ability to donate and accept electrons from neighboring molecular species. The chemical hardness (0.5687eV) indicating the molecule to be chemically stable. The electrophilicity index was found to be biologically active. Softness, another important descriptor predicts the toxicity of the chemical species. The title molecule has sufficiently softness value (0.8616 eV) suggest the molecule non-toxic nature theoretically [27].

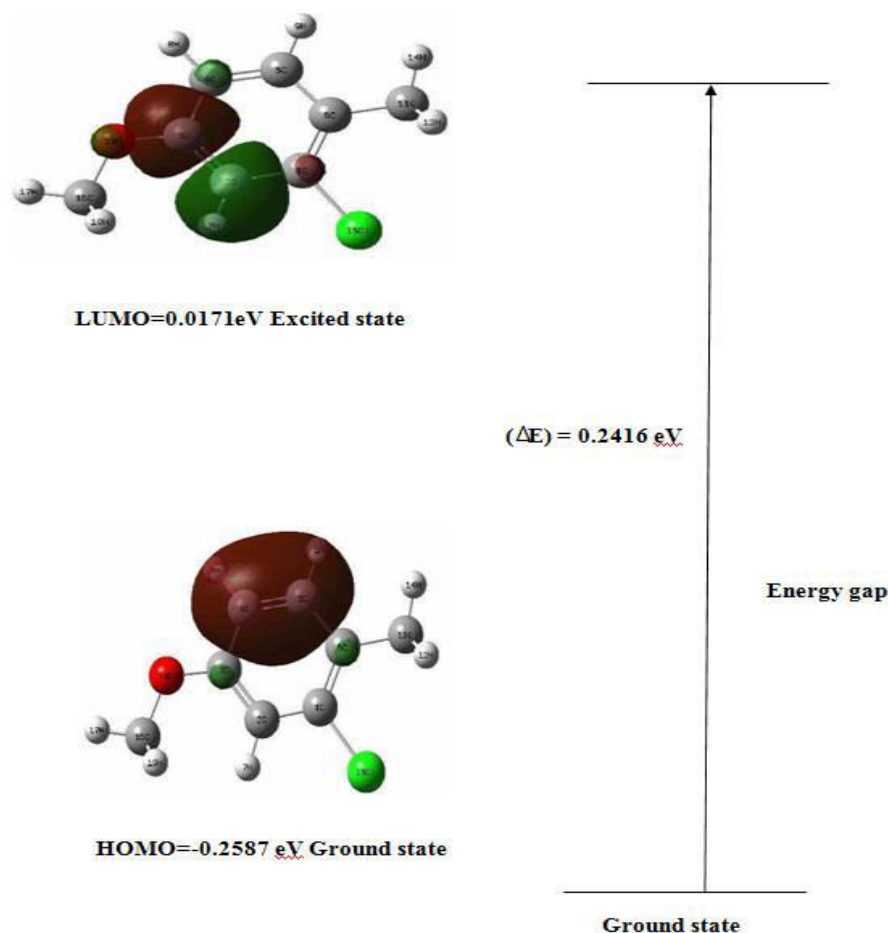


Fig.6: Pictorial representation of HOMO and LUMO for 3-Chloro-4Methylanisole

Table.5: HOMO- LUMO energy values of 3-Chloro-4-Methylanisole

Parameters	Values
E_{HOMO} (ev)	-0.2587
E_{LUMO} (ev)	0.0171
$\Delta E_{\text{HOMO-LUMO gap}}$ (ev)	0.2758
Electro negativity (χ)	0.2929
Global hardness (η)	-0.5687
Global softness (S)	0.8616
Chemical potential	-1.4303

Molecular Electrostatic Potential Surface

Molecular electrostatic potential is related to the electron density which is a very useful descriptor in understanding sites for nucleophilic reactions or electrophilic attack. As a result, this property was calculated for the target molecules at B3LYP/6-311++G (d,p) level of theory and indicated by a colour range from deep red to deep blue in the corresponding maps displayed. MEP was created by mapping of the electrostatic potential on the total electron density of the molecules for most active compounds shows in red the nucleophilic sites (negative potential) located at the oxygen atoms which result in hydrogen bond interaction [28]. The larger electrophilic sites (positive potential) appeared on the hydrogen attached to aromatic ring nitrogen consequence the blue cloud which was symbolized for electron deficient region, due to the accumulation of positive potential these moieties exhibited by hydrophobic interactions with the aromatic residues of active site in Fig.7. The MEP surface provides necessary information about the reactive sites.

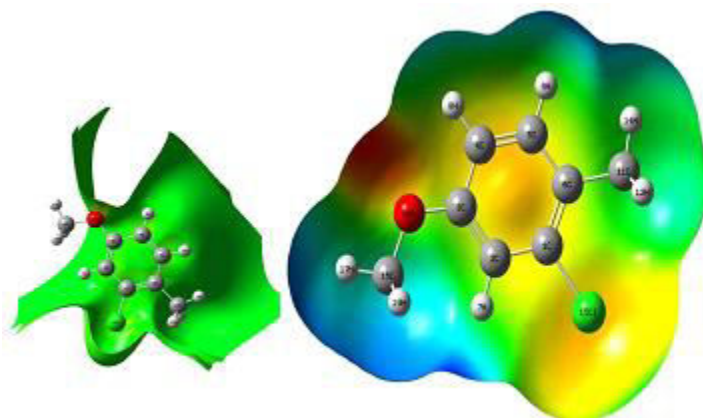


Fig. 7: Molecular electrostatic potential map for 3-Chloro-4-Methylanisole

MOLECULAR DOCKING ANALYSIS

Molecular docking is used to find the interaction between the ligand-protein. The pass (Predication of Activity Spectra for Substances) is an online tool to predict the activity of the CMA compound and also revealed that the compound have inhibitory activity. The residual structure of target is downloaded from RCSB (Research Collaboratory for Structural Bioinformatics) protein data bank .The Auto Dock Tools (ADT) graphical user interface has been used to prepare the protein by removing water and adding polar hydrogens along with charges [29-30].

The docking results shows that the amino acids are LYS33:HZ3 forms a hydrogen bonds with a bond length of 1.8 Å. The protein 2WKF form a hydrogen bond with CMA ligand with binding energy 4.3 kcal/mol. The RMSD of the residue of the target protein to 1.36Å and it shows that the molecule has strong inhibitory activity. Fig.8 show the ligand –substrate interactions and Table.7. gives the binding affinity values of different poses of the title compound predicted by Autodock Vina.

Table.7: The Calculated docking values for 3-Chloro-4-Methylanisole

S. No	Drug	Protein (PDB ID)	Docking core (k cal/mol)	H-Bond interaction	Distance(Å)
1	CMA	2WKF	4.3	LYS 33:HZ3 [O-H...O]	1.8

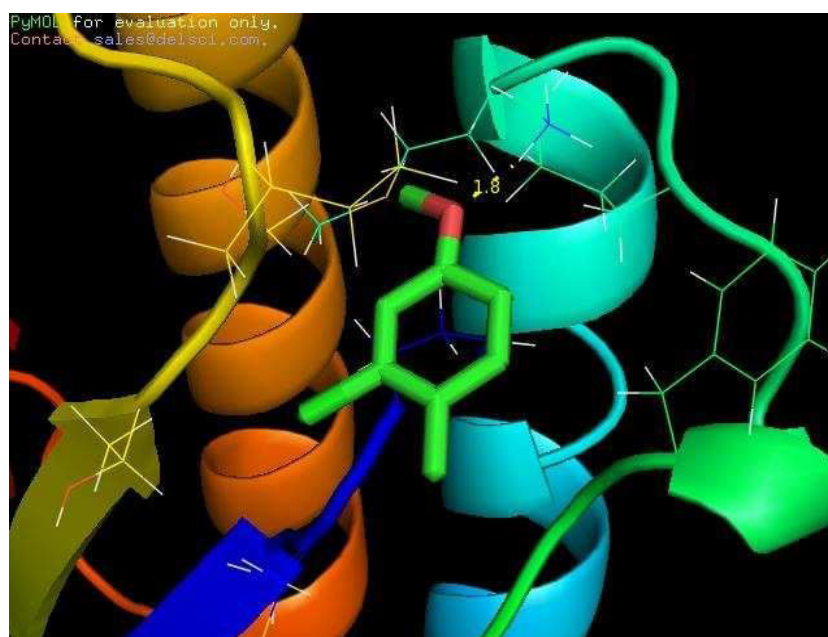


Fig.8: Docking pose for 3-Chloro-4-Methylanisole

ANTIMICROBIAL ACTIVITY

Agar disc diffusion method was used for the determination of antibacterial activity of the title compound CMA against two Gram-positive and two Gram-negative strains such as Bacillus thuringiensis, Streptococcus aureus, Pseudomonas aureus and Echerichia coli[31]. The target bacterial strains were cultured in Mueller-Hinton broth

(MHB). The title molecule CMA was dissolved in DMSO solution at concentration of 1 mg/ml. The concentrations of the tested molecule are fixed at 10 and 40 μ l. Amoxicillin was used as a positive standard reference to evaluate the sensitivity of each bacterial species tested. Antibacterial activity of tested compound was observed by measuring the diameter of the inhibition zone around the holes in each plate was measured and expressed in millimeters. The tested molecule displayed the highest inhibition efficiency (8-14mm) against all the bacterial strains when compared to standard antibiotic Amoxicillin. The electronic property of organic molecules is closely related to biological activity. The various substitutions of electron withdrawing atoms or groups such as fluoro, nitro and chloro on the benzene ring exhibited better biological activity. The observed zone of inhibition for antibacterial activity of CMA is shown in Table.8. From the observed results it is found that the title compound CMA showed greater activity against selected bacterial strains when compared to standard antibiotic [32-33].

Table: 8 The Antibacterial activity of 3-chloro-4-methylanisole at different concentrations against bacterial pathogens;

S.No	Cultures	Diameter of the Zone of Inhibition in mm					
		10 μ l	20 μ l	30 μ l	40 μ l	Control	Antibiotic
1	Bacillus thuringiensis	14	12	11	10	Nil	16
2	Staphylococcus aureus	8	10	12	14	Nil	-
3	Pseudomonas aureus	-	8	10	12	Nil	-
4	Echerichia coli	-	-	-	-	Nil	17

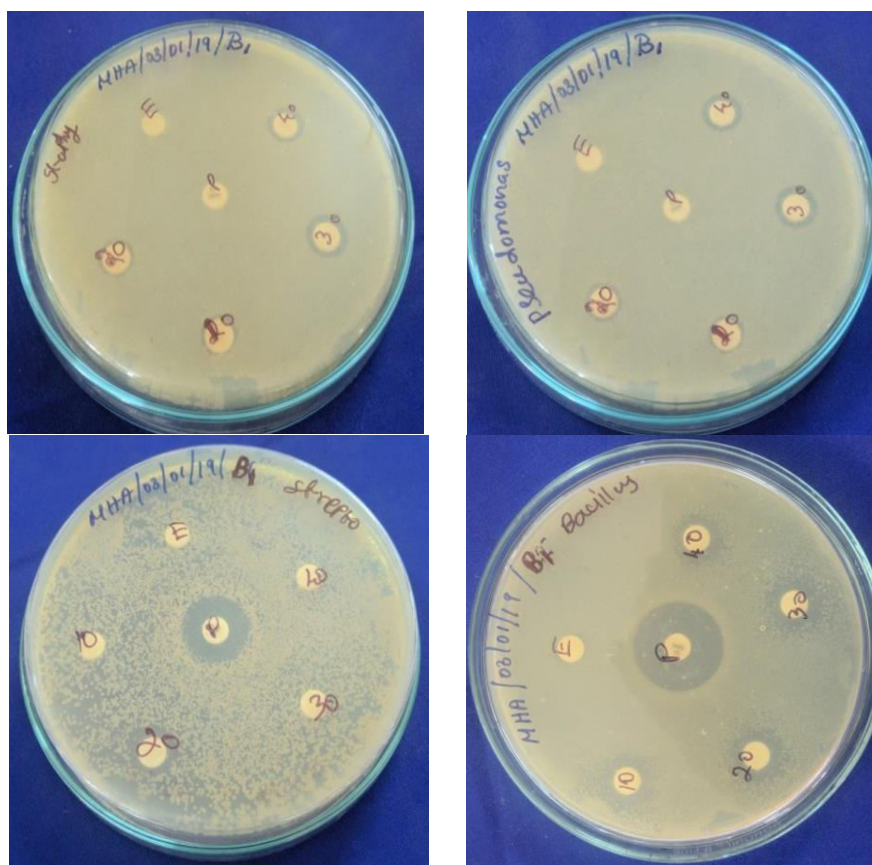


Fig. 9: Disk diffusion method of 3-chloro-4-methylAnisole at different concentrations;

CONCLUSION

A satisfactory vibrational analysis is made for CMA the present work. In this study, the vibrational frequencies were calculated and compared with the experimental data. It was found that the computations are in good agreement with experimental results. HOMO-LUMO energy gap explains the eventual charge transfer interactions taking place within the molecule. NMR study explains chemical shift of the title molecule. The reactive site of the title molecule has been found by MEP study. The molecular docking study shows that CMA molecule can bind with protein with binding energy of 4.3 kcal/mol indicate the title molecules have pharmacological properties. *In vitro* antibacterial activity revealed that the title molecule CMA possess potent antibacterial activities toward bacterial strains and compared to standard drug Amoxicillin.

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Reflections on the Impact of Technological Advancement on the Uses of Internet Applications: (Review Carried Out for the Faculty Research Project under Institute of Eminence Scheme, University Of Delhi)

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ABSTRACT

Technology is seen as a critical catalyst for reforming commercial activity and formulating corporate strategies in today's business world. Digital technology has proven to be the driving force behind the economy's growth and competitiveness. Jobs, enterprises, knowledge, communication, and relaxation are all linked to technological innovation today. It's difficult and incalculable, but it nevertheless piques our interest. It has unleashed enormous potential in the development of enterprises, promoting innovative concepts and speeding up the evolution of e-businesses and e-commerce, or electronic trade. In other words, it would be not only a viable electronic option but also a very profitable one when compared to a traditional business or trading method. The Internet, when used appropriately, can be incredibly advantageous and profitable for any business or enterprise, big or little, local, national, or global.

Keywords: technological advancement, e-business, automation, Internet, information technology

INTRODUCTION

The Internet has been a technical revolution for the global corporate landscape. It has created a planetary scale framework or system that will allow producers to reach consumers all over the world and have an ongoing collaborative relationship with them. Such consumer-facing openings are critical for a businessman who is exploring and employing the Internet as a tool for promoting his interests both regionally and internationally. Every day, the number of people who use the internet increases. According to the International Statistics Organization's Internet World Stat, the global population has surpassed 7 billion people, with 2 billion of them accessing the Internet.

The Internet provides undeveloped countries with a variety of development prospects. It has the ability to close present economic gaps faster than traditional techniques if done properly. Understanding the advantages, on the other hand, necessitates consideration of global competition. A few questions must be answered in order to comprehend human contact, business connections, and the growth of internet commerce. How can we assess the evolution of internet technology as a means of economic and social connections, and how do we change our perspective on trust? How would a company's brand grow a social network and build a brand in the face of the enormous dangers that e-business entails? What impact would e-business have on the market competition? The answers to all of these questions could influence how a businessperson or anyone interacts with technology and with oneself. Many businesses are now reorganizing their traditional sales strategies and utilizing an online sales system. Consumers are still hesitant to make purchases online, but the majority find it simple and convenient, and they do so regularly. Consumers are discovering the Internet quickly and readily, and it is assisting them in locating information and meeting their needs. Going online for a business gives it status, increasing brand visibility and consumer confidence in the company and its products. Customers believe that if a company does not have online capabilities, it is terrible, and they do not want to do business with them, according to the survey. In today's world, all businesses, regardless of size, provide online services and have their own application, allowing customers to research and learn more about the firm and its products. Information technology is no longer a commercial expansion. It has evolved into a necessity and a driving force for change. A traditional approach to technology was that information technology would automate and assist businesses or organizations. However, in today's world, it has undergone a profound structural transformation from the production of goods and services. It has implemented new concepts of re-engineering business processes. The development of advanced technologies and the Internet has provided opportunities and support to businesses in their processes.

E-business is no longer just a fad; it has ushered in a more thorough approach to the concept of "doing business." Technology has altered how information is used, how customers and suppliers are reached, how

marketing and promotions are conducted, and so on. In recent years, there has been an increase in the number of commercial online applications. Companies in a variety of industries, such as entertainment, banking, communication, and distribution, have altered their business practices to take advantage of new technology's benefits and power. The avenues and applications of technology have been opened for the new global economy. However, e-business is not built on the dissemination of information on a regular basis. There is an assumption that this continuous change would need continuous improvement and innovation. In order to compete with our competitors, we would require faster innovation as compared to our competitors (Apavaloaie, 2014).

LITERATURE REVIEW

Sharma, Bhargava and Singhal (2020) stated that the academic and industrial fields had been highly impacted by the Internet of Things (IoT). Advanced technology and its implementation in the healthcare sector would lower medical expenditures while also enriching the patient-centric approach to medicine and allowing for good healthcare competence. In the healthcare sector, however, there is ample room for them to reap the benefits of technology in terms of accuracy and cost. Embracing the Internet of Things in Healthcare Applications and Wearable Devices is a critical proclamation that examines current challenges and offers a solution for developing an intelligent healthcare system based on the latest technologies enabled by the Internet of Things, as well as identifying how the Internet of Things can help improve the efficiency of the electronic healthcare system in terms of wireless sensor networks. The IoT (Internet of Things) is about the things and devices working on the Internet and are established with electronic elements such as detectors, sensors, electronic components, actuators, and website links that help to maintain the connection and exchange of information and data in real-time. When it comes to the pharmaceutical industry, technology applications have completely revolutionized the system by facilitating and automating isolated patient care, developing effective pharmaceuticals, admitting patients, and so on. The pharmaceutical sector has gone in a new direction and has opened more gates for massive transformation with the collaboration of IoT and growing digitalization with advanced technologies.

Berisha-Shaqiri (2015) explained that a revolution in computer technology and communication had been observed in the past few years, and these are indicating the advancement of technology and usage of the Internet and information technology. People's lives have altered as a result of the technological revolution and the Internet, as has the way they conduct business. Companies may now contact a large number of clients by utilizing information technology. They may now present their goods more swiftly and effectively, as well as provide services in a more timely and efficient manner. Business owners may now effortlessly coordinate with suppliers and business partners all across the world. The impact of ICT and internet usage may be observed in the shift from an industrial to an information society and from an industrial to a knowledge economy. The Internet and information technology are not only necessary tools for human connection, but they are also novel. The Internet is a platform and is considered a strategic resource on which a company can do promotion of their work, products, and services and can-do expansion of their business in a new market. Utilizing this new technology in business can help businesses do their work more efficiently and create a competitive advantage. E-business has changed society, the economy as well as politics, and this is the reason a company that is facing high competition is trying to fulfil all the requirements and demands of their customers.

Javaid et al. (2021) revealed that manufacturing products nowadays have become more data-driven and intelligent. An intelligent production unit can have a powerfully associated industrial system that has tools, parts, materials, inventory, and logistics that have the ability to transmit data and communicate with others in the era of the Industrial Internet of Things, also called IoT. The Industrial Internet of Things is the sensors, equipment, and other linked devices networked in the industrial environment providing remote access, better monitoring of work, efficient collection of data, examination, and exchange of information and communication. Real-time operating efficiency in manufacturing is driven by the transformation brought by the Internet and advanced technologies in their production, supply chain, robots, linked equipment, and steady installed systems. All these systems help in reducing the risks and costs and help in innovation. Factories that are automated with advanced technologies are helping in increased production as they are less costly, more dependable, and have linked sensors. The Industrial Internet of Things will soon be used for the repair and development of equipment, self-diagnostic systems, and assembling of lines. It would reduce the downtime, full utilization of assets and resources, reduce the costs, lead to a more productive workforce, and better measurability of the outcomes, productive end products, and achievement in greater efficiency, cutting the operating costs and the developing of new sources of income. This advanced technology helps in rapid production, an effective supply chain, and reduction in the product life cycle. The Industrial Internet of Things shares and understands the current development in the industrial sector.

Yamin (2019) found that in present times, businesses are constantly attempting to make the best use of the Internet and new technology and their instruments to bring improvement in their work and to provide benefit to their clients and customers. The Internet of Things and its associated technologies are helping businesses in real-time and providing them with infinite processing and reducing the requirement for human monitoring. Likewise, virtual reality, artificial intelligence, and robotics have impressive and phenomenal applications in the medical field. Similarly, with the help of advanced technologies, predictions and mitigation of natural disasters can also be made like stampedes with the assistance of sensors and other advanced technologies. Businesses and government agencies are being influenced by the increase in Big Data Analytics as now they can make smart and quick decisions and achieve their targets before and on time.

Khanna and Kaur (2019) stated that modern agriculture is significantly influenced by modern technology and IoT as it is helping farmers in controlling their farms remotely and managing other agricultural activities inefficiently. As technology and IoT is not stagnant, new dimensions of IoT are possibly being overtaken in the future. The data that is being generated with the help of technology and sensors are of utmost importance and should be managed and examined with accuracy. It is expected that shortly advanced technology, sensors, transducers, and other associated devices will be connected over the Internet for controlling, communication, decision making, and interaction of farmers. All these activities that have been carried out by the technology would reduce human efforts, save their time and efforts, and yield more profits and productivity.

Dwivedi, Mehrotra and Chandra (2021) explained that the sudden outbreak of the pandemic had put the global healthcare system on high alert. This challenging situation has been eased to a great extent by introducing the Internet of Medical Things, also known as IoMT. Also, scientists and researchers have been motivated to bring out a new, advanced and intelligent healthcare system that would help in the early diagnosis of the disease and infection. It would prevent the spreading of the infection, educate and treat the disease, and would control the arrival of the new virus. The aim of this study is to identify the role played by the applications of the Internet of Medical Things and how it helps in improving the healthcare system and examining the status of the research showing the effectiveness of the Internet of Medical Things, its benefits to patients and to the system itself. A significant boost has been received by the healthcare system by advanced technologies like smart devices, remote health monitoring, platforms like telemedicine, drones, and robotics. These technologies have contributed significantly to the prevention of disease by the enablement of early diagnosis, screening, management, and improved living. The usage of these technological devices and automation has improved the healthcare system and reduced the need to visit hospitals.

Ashima et al. (2021) revealed that industrial revolutions had modified the landscape of the manufacturing sector in the past few decades. A highly flexible manufacturing process has been enabled by the intelligent manufacturing system that quickly transforms individualized mass production and develops high-quality, tailored goods. The surface of the finished jobs has been improved, and eliminated the defects in manufacturing with the usage of artificial intelligence, machines and technologies. The application of advanced technologies in additive manufacturing is a step taken toward an optimized and sustainable manufacturing process. The supply chain process is also improved with the application of automated additive manufacturing as it reduces the unnecessary costs of material inputs.

Tripathi et al. (2022) found that more than 70% of the Indian population is dependent upon agriculture. The Indian government is also promoting innovative and advanced technologies that can be used in the agricultural process. Promotion of different high-yield crops has been done by the government that would increase the production of nutritious food and crops. Indian rural areas have been developed with the implementation of advanced technologies and other smart instruments. Issues like transport, connectivity, water, education and health in the agricultural sector have been resolved by the application of advanced technologies. Management of crops, management of wastes, irrigation systems, management of energy and other activities related to agriculture are being controlled by IoT. It has supported the relief from poverty and has improved the living standard of the farmers in rural areas.

Bharti, Biswas, and Shukla (2021) stated that mechanisms and natural processes have always attracted and mesmerized humans and have encouraged the development of effective and practical solutions for the problems and have given rise to a new discipline called Computational intelligence or CI. Technological advancements have made the Internet of things admired and accepted in various fields like healthcare, agriculture, smart homes, manufacturing, etc. and have created a huge amount of assorted data from real-world applications. To handle this enormously generated data, the usage of modern technology is essential. Computational intelligence is the technique of developing an intelligent system that is based on computer techniques and offers tools that can be customized to meet the requirements and demands of IOT applications. Hence, this field is attracting the

attention of researchers and scientists. IOT and computational intelligence are expected to shape the future of IOT in many different ways.

REFLECTIONS - FUTURE & CHALLENGES

The Internet of Things (IOT) is now widely recognized as one of the most important areas of future technologies, with widespread use in governments, cities, military, education, hospitals, shopping malls, transportation and autonomous, connected cars, agriculture and other modern technologies. A great deal of study has gone into integrating IOT with smart environments. IOT is still evolving due to the incorporation of new concepts as well as the adaptation of old technologies. Green IOT's bright future will transform our future environment into one that is healthy, green, has a very high quality of service, and is socially, environmentally, and economically sustainable. The fascinating areas recently have been green design and implementations, integrated RFIDs, smart objects and sensor networks, green IOT services and applications, green communication and networking, mobility and network management, and the cooperation of homogeneous and heterogeneous networks. The relevance of internet applications in today's society and in the future is clearly demonstrated in the literature. Digital advancements, according to experts, will lead to improved communication among diverse groups, leading to greater interpersonal interactions and constructive community development. Physical barriers to communication and community development, according to a lot of respondents, will mostly disappear during the next half-century. They believe that increased connection will lead to improved collaboration in the face of significant global issues, more fair income and power distributions, and easier access to information and resources. The Internet has long since become a key infrastructure in our digitized environment. Interconnection is a necessary basis for future technologies such as artificial intelligence, virtual reality, and many more. It is impossible to achieve digitalization without the use of networks. This is why it is critical that we focus on the Internet's future - even at the level of fundamental infrastructure.

Any new technology brings with it an element of uncertainty and business risk. In the case of IoT, many of the threats are not physically evident but are rather misrepresented. While the building blocks to begin the process are already in place, fully developing the IoT vision will take time. Limited bandwidth, accessibility for all, security difficulties, and consumer expectations are only a few of the major concerns for the IOT's growth and development.

IoT devices significantly increase the "attack surface," or the number of potential entry points for thieves into a secure network. Cybercriminals do not need to break into an IoT device's plastic casing to obtain access to sensitive data; instead, they can exploit one of the IoT's many security weaknesses.

Another issue is society, as it is difficult to comprehend IoT from the perspective of clients and regulators. Customer expectations and requirements are changing, as are new uses for devices, changes in IoT technology, consumer confidence, and so on. IoT data is sensitive information that, if released, might put the system's control in the hands of an attacker. As a result, a powerful and trustworthy solution is required to safeguard the use of IOT data. Business policies and processes, as well as government regulations and norms, provide social and legal hurdles to the usage of IoT.

Connectivity is also a crucial challenge that comes to play here. As the IoT market grows tremendously, several experts are afraid that bandwidth-intensive IoT applications like video streaming could eventually run out of room on the present server-client model. As more and more devices connect to these networks, they frequently get overburdened. As a result, it's critical for IoT organizations to thoroughly vet their IoT connectivity providers and select one with a proven track record of service and innovation.

With so much competition in the IoT market, clients who don't get their expectations met aren't hesitant to look elsewhere. As a result, companies wishing to enter this competitive and inventive field should be prepared for a market that never stops moving and clients who demand a smoother, more modern experience. Though the Internet of Things is an exciting sector with a lot of potential for change, there must be an agreement from all stakeholders on security and performance issues in order for the IoT to remain secure and effective.

Security and privacy are other essential aspect of IoT that demands attention and extensive investigation. Weber focused on these challenges, suggesting that a private company using IoT should include data authentication, access control, attack resistance, and client privacy in their business activities as an added benefit. He recommended that in order to define global security and privacy challenges, IoT developers should consider the geographical constraints of various countries. In terms of privacy and security, a generic framework must be established to meet worldwide needs. Before designing a full-fledged operational IoT framework, it is strongly suggested to examine and recognize the concerns and obstacles in privacy and security.

Ethics, legality, and regulatory rights are also concerns for IoT developers. To maintain the standard, moral standards and to prevent people from breaching them, there are specific rules and regulations in place. The sole difference between ethics and law is that ethics refers to norms that people adhere to, whereas laws refer to limits imposed by the government. Ethics and laws, on the other hand, are intended to protect the standard and quality and prevent people from engaging in criminal behaviour. Several real-world problems have been solved as a result of IoT development, but it has also created significant ethical and legal challenges.

With the rapid expansion of IoT that occurs every day, the government is lagging behind, and businesses are frequently left without the critical information they require to make choices. The lack of effective IoT laws is one of the key reasons why the Internet of Things remains a serious security risk, and the situation is only going to grow worse as the possible attack surface extends to encompass more and more critical equipment. When medical equipment, automobiles, and children's toys are all connected to the Internet, it's easy to envisage a slew of possible disaster scenarios if there isn't enough regulation in place.

Despite the problems, we must recognize that we are at the start of a new era marked by digitalization and the constant interconnectedness of everything. The goal of the next generation of the Internet is to permit any requested bandwidth spontaneously between any and all participants or data centres through abstraction and automation. This will necessitate further development of existing technologies as well as the creation of new approaches to the integration of infrastructure, software, and services.

CONCLUSION

Advancements in technology, the Internet, and information technology have become indispensable elements of our lives, and their use benefits practically every area of our existence. The Internet is widely used and plays an important part in our lives. Machines, technology, digital applications, and artificial intelligence are providing the pharmaceutical industry with several chances for development and increased efficiency. Similarly, the Internet of Things and advanced technology applications such as enhanced structures and devices for drug trading as well as improved analytical tools are providing a number of creative opportunities to the pharmaceutical industry. IoT detectors and sensors aid in the monitoring of various biomaterials and chemicals, the detection of instrument defects, and the prevention of fraud. Thus, it can be said that technological advancement is making a positive impact on our lives, and in the future, it is going to provide many opportunities in various sectors like healthcare, agriculture, manufacturing, education, improvement in living standards, and much more. More investments must be made by the government in the field of technology and for its development and advancement.

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People Management Strategies of Hotels in Hinjewadi, Pune

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ABSTRACT

The goal of this study was to see how well human resource practices were being implemented in the hotels in Hinjewadi that were chosen. With a quantitative approach, a descriptive study was undertaken in renowned hotels in Hinjewadi, Pune. The data collection instrument investigates human resource techniques using the Competing Values Model. The data demonstrate a tendency toward more internal-environment-focused tactics and less external-environment-focused measures being implemented.

This phenomenon may represent the current position taken in organizations by human resource management, still quite unrelated to organizational strategy, market positioning, and organizational results, which are elements that are directly related to the outside world.

Keywords: Human Resources, Strategic Human Resource Management, Hotel Industry.

INTRODUCTION

According to Lengnick-Hall et al. (2009) strategic people management is not a new idea. The intellectual roots of that field refer to the 1920s in the United States, a time when the strategic vision of people management policies and practices began to be described and discussed by economists and academics of industrial relations. In that period a few elite companies intentionally formulated and adopted innovative people management practices, which represented a strategic approach to work management.

Meanwhile, until the 1980s, people management was mostly concerned with operational functions, such as process management and micro perspective. Beginning in that decade, the notion that the area might make a significant contribution to the definition and scope of strategic organizational objectives expanded rapidly, eventually leading to the macro perspective and the establishment of the strategic people management concepts (Gurbuz & Mert, 2011).

As a result of the formation of this strategic perspective, issues concerning the impact of people management practices on the implementation of organizational strategies arose, and alignment as a fundamental principle of the strategic model of people management was born.

The strategic alignment has two subdivisions:

- a) The external or vertical alignment referred to the adjustment between the people management model and some contingency factors such as strategy and organizational objectives, challenges of the competitive environment and characteristics of the society in which the organization is implanted (contingency approach);
- b) Internal alignment refers to the internal consistency of the people management model and implies articulation and coherence between people management strategies, policies and practices (configurational approach).

Reaching both alignments is a great challenge for organizations.

OBJECTIVES OF THE STUDY

1. To study the competing values framework (Model).
2. To find out people management strategies adopted by the selected hotels.
3. To determine the degree to which people management practices were being implemented in the selected hotels in Hinjewadi, Pune.

PEOPLE MANAGEMENT STRATEGIES

Before presenting the different people management strategies, it is convenient to define and present the distinctions between people management strategies, policies and practices, which are the three main elements that make up the function in an interrelated manner.

The people management strategy describes the orientation of the organization in the management of the human factor, providing cohesion to the set of practices through which it is implemented. People management practices

are limited to more specific functional areas and the policies are located at an intermediate level because they describe the coordination of two or more practices to achieve the objectives, such as involvement, security or improvement of communication channels in the workforce (Martín-Alcazar, Romero-Fernandez & Sánchez Gardey, 2005).

According to Schuler & Walker (1990) people management strategies can be conceived as a process and a set of activities that identify specific issues of management of people that interest the business. This activity is based on a joint effort of the human resources and line managers to respond to business concerns related to people, seeking to achieve the strategic objectives of the business and adding value to the organization to improve its current and future performance and sustain the competitive environment.

The Competing Values Framework (CVF) Model has been used to define different approaches to people management in organizations. It was developed by Quinn & Rohrbaugh (1983) as a model for organizational analysis and is quite broad and applicable to the investigation of various aspects, such as culture organizational, leadership, organizational effectiveness, quality management and people management (Cameron & Quinn, 2006).

The model is based on four sets of values that compete with each other reflecting the dilemmas of the organizational system. It is emphasized that it does not suggest that one value overrides another but that tries to provide a better understanding of the balance between them. The model comprises a combination of two dimensions:

- The first is based on the organizational structure with the possibility of emphasizing flexibility and dynamism or stability, order and control;
- The second is related to the organizational approach, differentiating the orientation towards internal environment, integration and unity, from orientation towards the external environment, differentiation and rivalry.

These two dimensions give rise to four quadrants that represent different models according to the main characteristics and assumed values. Cameron & Quinn (2006) indicated its use for people management (Figure 1).

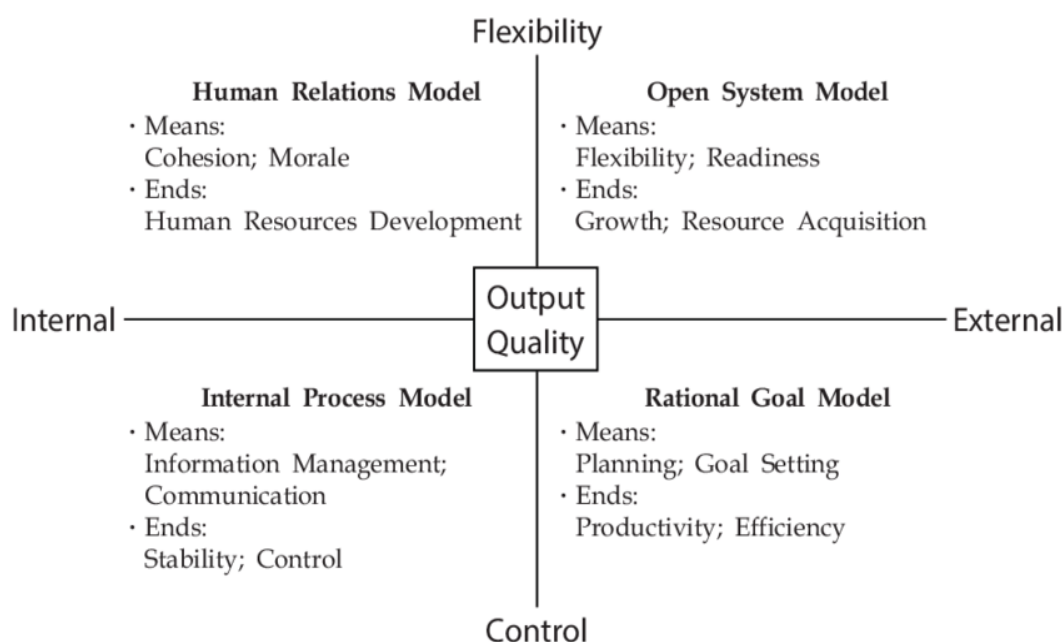


Figure 1: The competing values framework *Source:* Quinn and Rohrbaugh (1983)

The human relations model is characterized by flexibility and internal focus. Emphasize the teamwork and employee engagement through the development of a strong system of values that promotes corporate identity. The main objective is to support the high moral, based in friendly and almost family relationships, in addition to supporting employees in professional and personal matters. A good relationship is the result of merit, equal opportunities, participation and commitment. The motivation is based on empowerment, development and communication, and the success is measured by the valuation of people.

The open system model is defined by flexibility and external focus. Stimulate initiatives innovative and the development of new services for employees. The dominant culture encourages use of employee ideas, creativity and entrepreneurial and risky character; and his objective is to create a vision of the future in the organization. The main responsibility of HR is accompany environmental changes, being able to adapt to them by improving and acquisition of new resources, methods and processes. Success is defined based on flexibility and adaptation to change.

The internal process model is characterized by internal focus and control. It emphasizes employee control, standardization of procedures, information management, and maintenance of stability and hierarchy. The improvement of processes, regulations and work analysis through methods such as reengineering, facilitates the work of HR. The predictability and efficiency of the process are criteria for success.

The rational goal model is marked by control and has an external focus. Its basic characteristic is the orientation towards the results. The HR setup emphasizes planning, goal setting, achievement of measurable goals and objectives, and measures of productivity and competitiveness. Importance is also attached to the relationships between the HR function and its external stakeholders. Its main role is to be a strategic partner by aligning its policies with the business strategy. For this, tools such as the development of performance models and the relationship between evaluation and rewards are used. Profitability, efficiency, productivity, reputation and competitiveness are criteria for success.

It should be noted that the Competing Values Model will serve as the basis for the analysis performed in this work.

RESEARCH METHODOLOGY

This study is characterized as descriptive because it is proposed to evaluate the degree of implementation of people management strategies in the hotel industry of Hinjewadi, Pune. In relation to methodological approach, this study is characterized by being a survey that makes use of quantitative methods.

POPULATION AND SAMPLE

The population of this research covers the prominent hotels located in the Hinjewadi I. T. Park. The sample was 10 hotels (Hotels name are not specifies due to their request). Some refused to participate in the survey. 50 managers from the 10 hotels took part in the survey.

DATA COLLECTION AND ANALYSIS

The data were tabulated, measured and analyzed quantitatively with the use of following techniques: arithmetic mean, factor analysis and reliability analysis. Arithmetic mean was used to provide an indication of the degree of implementation of the people management strategies. The factor analysis was used to confirm the theoretical dimensions and the grouping of the indicators, condensing the information and summarizing the data. The reliability analysis allowed to prove the internal consistency of the indicators used to compose the theoretical dimensions used, generating quite high Cronbach's alpha coefficients, all above 0.85.

Construction of the Measurement Scale of Human Resource Management Strategies in Hotels

Table 1 presents the 20 people management strategies selected to constitute the scale indicators to measure the strategies adopted by the hotels, following the grouping into the four theoretical settings described here.

Setting	People Management Strategies*
Human Relation	1-Promote a better work environment 2-Stimulate people's commitment to the company 3-Invest in the development of managers and leaders 4-Stimulate the integration of employees and teamwork 5-Develop transparent and effective communication
Open System	1-Stimulate career development and management 2-Develop organizational and individual competencies 3-Facilitate organizational transformation 4-Stimulate and support employee initiatives 5-Prepare the organization to face future challenges
Rational Goal	1-Promote the management of people focusing on the results 2-Identify and implement best people management practices 3-Develop a high performance culture 4-Promote the reach of the hotel goals 5-Recognize and reward people

Internal Process	1-Achieve operational excellence in people management services 2-Stimulate knowledge management 3-Promote organizational learning 4-Stimulate the continuous improvement of processes within the hotel 5-Promote efficient administration
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Table 1: 20 People management strategies of selected people to compose the measurement scale.*Source: Research Data

Implementation of Human Resource Management Strategies in Hotels

People management strategies were evaluated by the managerial level employees of Kitchen, F & B service and accommodation on a scale of 0 to 10, in which 0 meant very low grade and 10 represented a very high degree of implementation of the aforementioned strategies by the hotels included in the study.

Setting	People Management Strategies	Mean	Standard Deviation
Human Relation (Mean = 7.75)	Promote a better work environment	7.80	1.44
	Stimulate people's commitment to the company	8.03	1.49
	Invest in the development of managers and leaders	7.10	1.95
	Stimulate the integration of employees and Teamwork	7.94	1.58
	Develop transparent and effective communication	7.89	1.56
Open System (Mean= 7.41)	Stimulate career development and management	7.05	1.98
	Develop organizational and individual competencies	7.29	1.76
	Facilitate organizational transformation	7.30	1.71
	Stimulate and support employee initiatives	7.70	1.69
	Prepare the organization to face future challenges	7.72	1.67
Rational Goal (Mean = 7.47)	Promote the management of people focusing on the results	7.54	1.77
	Identify and implement best people management practices	7.26	1.60
	Develop a high performance culture	7.05	1.66
	Promote the reach of hotel goals	7.82	1.58
	Recognize and reward people	7.77	1.78
Internal Process (Mean = 7.66)	Achieve operational excellence in people management services	7.65	1.64
	Stimulate knowledge management	7.37	1.78
	Promote organizational learning	7.44	1.78
	Stimulate the continuous improvement of processes within the hotel	7.80	1.53
	Promote efficient administration	8.03	1.56
General Mean		7.57	1.67
* The degree of implementation of people management strategies was evaluated by managers on a scale of 0 to 10, varying respectively from very low to very high.			

Table 2: Level of implementation of people management strategies in hotels.

The degree of implementation of people management strategies by hotels reached an overall average of 7.57, which is considered a high grade (Table 2). It was observed that the 20 Indicators used received similar grades, all higher than 7.0, with mean standard deviation equivalent to 1.67. It is possible to infer that people management strategies are fairly implemented by the hotels in Hinjewadi.

- Two strategies obtained mean values greater than 8.0, which represent a degree of very high implementation: Stimulate people's commitment to the company and promote a efficient administration, both with an average equal to 8.03.
- Three other strategies reached averages quite close to 8.0: Stimulate the integration of employees and teamwork, with average of 7.94; Develop a transparent and effective communication, with an average of 7.89; and promote the reach of hotel goals, with average equal to 7.82.

- The two strategies that received lower notes, both with an average of 7.05, were: Develop a culture of high performance and stimulate career development and management.
- The third least implemented strategy was to Invest in the Development of managers and leaders, with an average of 7.10.
- The fourth average, 7.26, was attributed to Identify and implement best people management practices.
- Develop organizational and individual competencies reached an average equal to 7.29.

Refining the Measurement Scale of Human Resource Management Strategies

In order to confirm the formation of the four people management settings 20 management strategies are investigated, the factor analysis technique was used. The purpose of using this analysis is to reduce the number of variables to make the analysis clearer.

People Management Strategies	Rational Goal $\alpha = 0.913$	Human Relation $\alpha = 0.898$	Internal Process $\alpha = 0.913$	Open System $\alpha = 0.846$
Identify and implement best people management practices	0.810			
Develop a high performance culture	0.804			
Promote the management of people focusing on the results	0.802			
Promote a better work environment		0.847		
Stimulate people's commitment to the company		0.804		
Stimulate the integration of employees and teamwork		0.700		
Stimulate the continuous improvement of processes within the hotel			0.843	
Promote efficient administration			0.794	
Achieve operational excellence in people management services			0.646	
Facilitate organizational transformation				0.902
Develop organizational and individual competencies				0.879
Stimulate and support employee initiatives				0.843

Table 3: Factor analysis and reliability (α) of people management strategies.

Table 3 presents these four dimensions with their respective Cronbach's alpha coefficients. The first three were generated in a joint factor analysis with nine indicators and the last one was generated in an isolated factor analysis with three indicators, totaling the use of twelve indicators.

The **Rational Goal** setting obtained a Cronbach alpha coefficient equal to 0.913, indicating a high level of internal consistency among its indicators.

It covers the following people management strategies: Identify and implement best people management practices. Develop a high performance culture; and promote the management of People focusing on the results.

These three strategies reflect the orientation towards results, goal achievement, productivity measures and competitiveness, which are basic characteristics presented by the theoretical model (Cameron & Quinn, 2006).

The **Human Relations** setting reached a Cronbach's alpha equal to 0.898, which is also considered very good. It was constituted by the indicators: Promote a better environment of job; Stimulate people's commitment to the company; and stimulate the integration of Employees and teamwork. These indicators faithfully reproduce the emphasis placed on the teamwork, employee engagement and good working relationships evidenced in theory (Cameron & Quinn, 2006).

The **Internal Process** setting achieved a high level of reliability with an alpha coefficient of 0.913. This dimension encompassed the following people management strategies: Stimulate continuous improvement of processes within the hotel; Promote efficient administration; and Achieve operational excellence in people management services. These strategies are consistent with the theoretical description of the Competing Values Model, which highlights efficiency and process improvement as central concerns of this dimension (Cameron & Quinn, 2006).

Finally, the **Open System** presented a Cronbach's alpha equal to 0.846, which is a very good reliability coefficient. The indicators used for its composition were: Facilitate organizational transformation; Develop organizational and individual competencies; and Stimulate and support employee initiatives. These indicators corroborate the ideas supported by the theory, which associate to this dimension the sense of renewal, change, continuous improvement, creativity and innovative initiatives (Cameron & Quinn, 2006).

CONCLUSION

The present work was proposed to evaluate the degree of implementation of people management strategies of Hotels in Hinjewadi, Pune. The results show that according the perception of the managers of the ventures studied; there is a high degree of implementation of all people management strategies.

Among the strategies that obtained the highest levels of implementation are those that emphasize the encouragement of employee commitment, teamwork, and effective communication, the promotion of efficient administration and support to reach the goals of the hotel. These are compatible with the modern people management systems suggested by various authors to ensure the survival of hotel ventures in the market.

When comparing the level of implementation of the four settings of people management strategies of the competing values model, a reasonable balance is observed. However, it is possible to observe a trend of greater implementation of the strategies that present an organizational approach oriented to the internal environment, represented by the Human Relations and Internal Process settings; and of less implementation of the strategies presented an organizational approach oriented to the external environment that make up the Open system and Rational Goal. This trend may be a reflection of the current people management in organizations, still quite disconnected from organizational strategies, market positioning and organizational results, which are elements directly associated with the external environment.

On the other hand, the relative balance found between the settings is a basis of Competing Values Model that suggests the complementarity of the people management models.

It can be said that the study was able to broaden the understanding of the strategic management of people, presenting sets of interdependent management strategies that are reinforced mutually to produce a synergistic effect. It also contributed to subsidize the understanding of configurational approach, which is the most complex among the three theoretical approaches to strategic people management and the most lacking empirical support.

It is also important to remember that this study revealed a wide range of people management strategies that reflect the practical reality of contemporary organizations, supporting the development of a measurement scale capable of refinement and replication.

FURTHER RESEARCH

As a suggestion for complementary research studies are recommended similar in other geographical regions of the country and in other countries with cultural characteristics different, to allow comparing and identifying possible differences.

In addition, it is recommended to replicate this study in larger samples of probabilistic nature to confirm the feasibility and reliability of the proposed scale.

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Impact of Tourism on Socio – Economic Status of People in Nilgris District

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ABSTRACT

One of the sectors of the economy that is expanding at the quickest rate in the developing countries is tourism. Tourism is essential to the economic growth of a number of emerging nations, and this trend is expected to continue. As a result, a significant number of underdeveloped nations have incorporated their tourism industries into their overall plans for economic growth. The rise in tourism is mostly attributable to factors such as growing worldwide incomes, an increase in leisure time, a rise in world population, a decline in actual transport costs, a shorter amount of travel time, and globalization. It has also been said that the tourism sector helps to contribute to balanced regional development within a country. Indian culture, historical sites, lengthy beach stretches, and hilltops are all so beautiful and peaceful that they draw travellers from all over the globe. When compared to other industries, the tourist sector is particularly important in defining equitable and sustainable growth in a developing country like India's. The Specific purpose of this study was to know the Impact of tourism on Socio – Economic status of people in Nilgiris District. Nilgiris district is selected for the study purpose. Sample of 110 people was taken on the basis of convenience sampling technique to assess the impact level of tourism on socio economic status. Tourism plays a major role in developing the socio economic status of the people in Nilgiris district. Study shows a positive impact over the people's life in local area i.e., Nilgiris district. So it is the duty of the local authority has to focus on various on developmental activity at the local area and it will surely show progress in the socio economic status of the local people.

Keywords: Tourism, Transport, Travel, Travellers, India, Culture, Heritage.

1. INTRODUCTION

The world is a book and those who do not travel read only one page."

- *St. Augustine*

Over the last several decades, there has been a growing consensus that the tourist industry ranks among the top five biggest and most quickly expanding sectors of the world economy. One of the sectors of the economy that is expanding at the quickest rate in the developing countries is tourism. (Tosun, 2001). Tourism is essential to the economic growth of a number of emerging nations, and this trend is expected to continue. It has come to everyone's attention that tourism, provided it is well-planned and well-managed, has the potential to make a sizeable contribution to the expansion of other industries, the development of respectable employment opportunities, and the production of opportunities for commerce and business. In poor nations, tourism is often regarded as one of the most environmentally responsible and effective strategies for combating poverty and fostering economic diversification and job creation (Honeck, 2012).

As a result, a significant number of underdeveloped nations have incorporated their tourism industries into their overall plans for economic growth (Balaguer & Jorda, 2002). The rise in tourism is mostly attributable to factors such as growing worldwide incomes, an increase in leisure time, a rise in world population, a decline in actual transport costs, a shorter amount of travel time, and globalisation (Wen & Tisdell, 2001). The creation of jobs, the earning of foreign currency, and the improvement of the welfare of communities are three of tourism's most significant benefits (Andriotis, 2002). It wasn't until the late 1990s that people began to understand that tourism had the potential to alleviate poverty by increasing local revenue. According to Ashley et al. (2000), "four ways in which tourism can generate local income – wages from formal employment, earning from selling goods, services or labour, profits from locally owned enterprises, and collective income through community owned enterprises" are all examples of how tourism can help generate income in the local community. It is also thought that tourism results in increased money for the government, some portion of which would eventually benefit the less fortunate. It has also been said that the tourism sector helps to contribute to balanced regional development within a country. It has been suggested that this sector is essential in order to achieve a more equitable distribution of wealth and income within an economy. Given these circumstances, the tourist industry in India may be seen as vital to the country's efforts to achieve equitable and sustainable development.

While there is no doubt that tourism can have a positive impact on many aspects of the economy, culture and politics of a given country, there is no doubt that this "smokeless industry" has the potential to forge bonds

between countries around the world. This belief has been consistent across all of these groups (Richardson, 2010; Gill & Singh, 2011; Gill & Singh, 2013). A fundamental aspect of the human condition is the desire to broaden one's horizons by participation in novel and exciting activities, the acquisition of new knowledge, and the pursuit of enjoyable pastimes, all of which contribute to the development of a thriving tourist industry. In addition, there are a number of causes that encourage tourism, such as socio-cultural activities, religious practises, and commercial endeavours.

As a result of human nature's constant desire to seek out new horizons of opportunity and happiness by travelling to new places to satisfy their thirst for knowledge, economic and political interests, India, Located the Northern Hemisphere's South Asia region, it is bordered by the Indian Ocean on three sides and the Himalayan Mountains on the fourth has seen numerous inbound and outbound voyages. India has always been a nation that values both religious tolerance and ethnic variety while maintaining a strong sense of national identity. When it comes to India's population there is a great deal of variation in terms of language and cultural practices, as well as in terms of cuisine and festival attire as well as caste and religion. Besides being the world's biggest democracy, India is also the seventh-largest country by area, the second-most populated country, the tenth-most industrialized country, and the sixth nation to visit space.

Many in the developed world, particularly those in the United States and Europe, are taking notice of India's increasing middle class as a major economic opportunity with hundreds of millions of prospective customers. Indian culture, historical sites, lengthy beach stretches, and hilltops are all so beautiful and peaceful that they draw travellers from all over the globe. All of this has made India a nation of plenty and wealth from the dawn of time. The people of India are jovial and accepting. Geographical advantages, abundant natural resources, and, perhaps most significantly, India's rich historical and cultural legacies make the country an ideal destination for tourists.

When compared to other industries, the tourist sector is particularly important in defining equitable and sustainable growth in a developing country like India's. In India, the tourism industry is one of the most labor-intensive industries. According to an estimate provided by the planning commission, which is now known as NITI Aayog, 89 jobs are produced in the tourist industry for every million rupees spent, but only 45 jobs are created in the primary sector and 13 jobs are created in the secondary sector. Approximately three times as many people are employed indirectly in the tourist industry than are employed directly.

In India, the tourism industry was responsible for the creation of approximately an estimated 500,000 people would be employed by the Indian government in 2012-13 (Sahu and Batta, 2000) (Suba and Selvachantra, 2013) (Batta, 2000), while foreign visitors spend around INR 10 billion a year on handicrafts. (Sahu, 2013; Suba and Selvachantra, 2014). (Mishra & Rout, 2012-13).

The performance of the tourist industry in the context of India is fairly good. The overall contribution of travel and tourism to India's gross domestic product in 2015 was INR 8,309.40 billion, which is equivalent to 6.3 percent of India's GDP. It was responsible for 8.7 percent of total employment in 2015, which translates to 37,315,000 jobs as a result of its contribution, which was the number 6. (WTTC, 2016b). The amount of INR 1,249.30 billion worth of visitor exports that were created in 2015 was due to tourism, which accounted for 4.2 percent of overall exports. Investment in India's tourism industry reached a total of 2,264.10 billion Indian Rupees in 2015, representing 6% of the country's overall investment (WTTC, 2016b). An added benefit is the country's increase in its foreign currency due to the influx of visitors from other countries (RRPLT, 2014).

The preceding conversation has shown us that tourism may have a significant socioeconomic influence on the expansion of Indian states and union territories, as well as make a contribution to the expansion of the country as a whole. It is possible to think of it as the driving force behind the expansion of the Indian economy. It has the potential to be a determining factor in the advancement of society and the enhancement of the quality of life. It has the potential to increase the number of socioeconomic and cultural interactions throughout the history of humanity. In the big picture, it has the potential to be a factor in the country's continued and sustained growth and development.

2. LITERATURE REVIEW

In his paper titled "Pilgrimage along hallowed road," which was published in 1987, **Robert H. Stoddard** provided descriptions of travel routes that were related with religious motivations. He has spoken about the social, economic, and political significance that has been established as a result of the trip of millions of pilgrims.

An early research on tourism can be found in **Jagmohan Negi's** book, which was published in 1990 by Gitanjali Publishing House in New Delhi and is titled "Tourism and Travel: Concepts and Principles." The first chapter discusses the breadth of tourism, the make-up of the tourism business, growth in tourism, the nature of tourism, and its distinguishing features. The multiplier theory formula $K=1/5$ has been discussed in detail by the author. The six primary categories of expenditures are as follows: (i) lodging; (ii) food and beverage; (iii) shopping; (iv) sightseeing; (v) amusement; and (vi) local transportation and other expenses. The author has then explored tourism in relation to economic development, tourism in relation to national revenue, tourism in relation to public finances, tourism in relation to the environment, the costs of tourist, and the educational and spiritual value of tourism.

The topic of discussion in the third chapter is the many aspects of tourism, including natural resources, tourism infrastructure, superstructure, transportation, hospitality resource, tourist attractions, entertainment demands, and tourist destinations. He has categorised the different kinds of tourism based on factors such as origin and destination, movement patterns, the seasonal nature of incentives, the socioeconomic and social features of demand, the purpose of the visit, and the sociological aspects of tourism. The topics of social tourism, cultural tourism, conference tourism, and religious tourism are all brought up and discussed in this article. The author also discusses several types of tourism based on factors such as the number of participants, the length of the trip, the mode of transportation used, and the impacts of the trip. The many kinds of lodging may be broken down into categories according to the following criteria: economic significance; uses; kind of property; duration; level of comfort; price; object of establishment; geographical location of establishment; use; construction; size; and volume. The fifth chapter is titled "Tourism-Transport Facilities," and it examines several modes of transportation, including water transport, air transport, road travel, and rail transport. The author addresses topics such as advertising and sales promotion, marketing and tourism, pricing distribution networks, and advertising. He continues his discussion of the tourist marketplaces by going into detail on the features of tourist markets. The topic of tourism finance and investment is covered in the eighth chapter, while domestic tourism is covered in the ninth chapter. The tenth and last chapter is all about the state of tourism. In particular, he works with the Indian Tourism Development Corporation (ITDC) and the Hotel Corporation of India. He also works with the Ministry of Tourism and the Department of Tourism. He talks about the policies around tourism and planning. In his last point, he discusses the need of cultivating an atmosphere that is conducive to the growth of the tourist industry. The book written by Jagmohan Negi is considered to be a seminal work in the field of tourism.

The **Indian Institute of Public Opinion** released a study in 1991 titled "Tourist," which provided a comprehensive overview of the many facets of the tourism industry's expansion in India at the time. According to the article, India is home to a plethora of magnificent tourist destinations; yet, the country's marketing and promotion of these destinations could stand to be more aggressive. When compared with the growth rate data of other Asian nations, India's performance was found to be significantly lacking in this particular area. According to the findings of this study, India's progress in the growth of this business is hampered by a lack of adequate marketing efforts. According to the findings of the study, the primary reason why Sri Lanka, Singapore, Thailand, and Malaysia have been so successful in this business is because they have placed a greater emphasis on the marketing components of it.

According to **Galiti** (1993), the scenarios of tourism development in India include the Lack of political and administrative will, infrastructure, or foreign currency; exploitation by private hotels; tour guides who are knowledgeable about cultural and historical treasures; and sanitary eateries. He is certain that the bottlenecks should be eliminated, and that a well-planned large-scale marketing strategy for the expansion of the tourist industry may be an asset to the sector as a whole.

By examining the connection between the two, **Sinha Amila** (1994), in her article titled "Socio-economic impact of tourism," provided an explanation of the meaning of social change brought about by tourism as well as the meaning of economic indicators that bring about change in an economy due to tourism.

The marketing approaches for developing tourism are discussed in **P. B. Patil's** book *Tourism Development Problems and Prospects*, which was published in 2006 by Current Publications in Agra. The book is named "Tourism Development Problems and Prospects." The background of the tourist crisis in Maharashtra and Goa is referred to quite a bit throughout the framework. The book is broken up into a total of eight chapters.

The author starts off their discussion with the idea of vacationing. It has been established that tourism is mostly engaged in for the purpose of recreational purposes, and that the money gained from one's usual area of residence is used to finance expenditures made in the locations that are visited. The three criteria of tourism are

that it includes travel by a non-resident, stays of a transitory nature in the location visited, and that the stay is not tied to any activity for which the visitor gets compensated. It is possible to classify tourism into a number of broad categories, including pleasure tourism, leisure tourism, religious tourism, sports tourism, adventure tourism, social tourism for the purpose of meeting friends and relatives, and professional tourism for the purpose of conducting business, receiving education, or attending conferences. The second form of categorization divides tourism into three distinct subcategories: domestic tourism, inbound tourism, and outward tourism. The term "tourism industry" refers to the collection of organisations and commercial concerns that are responsible for supplying visitors with the necessary goods and services. This sector brings in foreign currency, fosters international understanding, enhances national and cultural integration, generates job possibilities, improves public perception, and fosters emotions of adjustment and compromise. The economy, the environment, and the people all feel the significant effects of tourism.

The author has covered several aspects of tourism in India, including the marketing perspective, the marketing techniques, and the value of promoting tourism. An overview of a qualitative methodology for analyzing tourist assistance systems is provided by the author. This research is an effort to investigate the marketing tactics that may be used to grow the tourist industry in Western Maharashtra and Goa.

In the second chapter, a review of the relevant literature is provided, along with discussions of the study's methodology, goals, scope, and data collecting. The expansion of tourism in India is the topic of the third chapter of this book. The findings of the survey are presented in the fourth chapter, which is on tourism in Western Maharashtra and Goa. It discusses the tourist industry in the state of Maharashtra, including the cities of Mumbai, Pune, Kolhapur, Solapur, Lonavla-Khandala, and Mahabeleshwar. It discusses tourism in Goa, specifically focusing on Panaji's churches, temples, beaches, and waterfalls as points of interest. In the section entitled "Issues and Challenges in Marketing of Tourist Services," the fifth chapter may be found. This chapter discusses the challenges that are faced while promoting tourist destinations. In the context of Goa's tourist industry, the author proposes incorporating elements of Western "adventure tourism" with Eastern "religious tourism" culture.

The author has focused their attention on the promotional components of tourist items, such as accord, attendance, and awareness. In the case of India, there is importance attached to the three P's, which are people, physical proof, and the process. The author also addresses the topic of forging a personal tie, building professional relationships, and creating an image for a corporation as a strategy.

The tourism policies of India's eleven different state governments are discussed in the seventh chapter, which is titled "National Tourism Policy." The author arrives to the conclusion that there is a need for a more aggressive market approach. He has made an effort to do a SWOT analysis.

According to the findings of **Sharma and Pamdey** (2009), inhabitants of coastal regions where there is a high concentration of tourist activities experience a greater amount of the beneficial effects of tourism than do residents of hinterland areas who live in close proximity to tourist hotspots.

The work of **Paramasivan and Sacra** in 2010 brought to light the complexity of our environment and helped disseminate the word that there are things that should be done and things that should not be done in order to safeguard our planet earth.

According to the findings of a research by **Vijayanand S.** (2012) titled "Socio Economic Impacts of Pilgrimage Tourism," it was found that pilgrimage tourism is having a significant impact on the growth of the socioeconomic system. He made the observation that when compared to the total GDP and exports of the world, the economic value of tourism for pilgrimages is quite high for a number of nations. Pilgrimage tourism is an important and lucrative industry for many nations, allowing them to effectively transform their local resources into international currency. According to the findings of the research, the social value of pilgrimage tourism may be quantified in terms of employment, particularly unskilled labour, and it is shown to have a significant impact. It has also shown that suitable interventions associated to pilgrimage tourism may play a role in enhancing standards of living and alleviating poverty in local communities. This has been one of the findings of the study. It is often required to devise and put into action plans that make use of the potential advantages that pilgrimage tourism may bring to socioeconomic development.

According to the findings of **Ray et. al.**, (2012), rural tourism not only boosts the local economy but also improves socio-cultural conditions. This is because rural tourism alters the lifestyles of local people who live in and around tourist destinations. Therefore, the growth of tourism in a region has a significant influence on the economy of that area. The presence of rural tourism in such areas results in improvements to the quality of life

in terms of communication, sanitation, and transportation. The research went on to uncover further information about Kamarpukur, which indicated that it had excellent potential both as a rural tourist destination and as a destination for pilgrimage tourism. Due to the fact that the interests of tourism and the preservation of history are complimentary, tourism and culture have become partners in the process of growth. It is possible to say that India, with its extensive history of religious tourism, has the potential to become an attractive tourist destination for prospective travellers. As a result of such trips, the local community saw an increase in economic growth since the visitors and pilgrims continued to engage in the consumption of local goods.

According to the findings of **Kakkar and Sapna** (2012)'s study article, travelling and tourism have developed into an essential aspect of everyday life for the average person. The tourism business is India's most dynamic and lucrative tertiary activity, and it's worth several billions of dollars. tourism's effect on the local economy and ecology in Dehradun District. Because of its emphasis on innovation and providing added value to visitors, India's tourism sector must be evaluated in terms of its Socio-economic magnitudes in order to fully realize its full potential and prospective performance.

Singla (2014) presented a constructive strategy for dealing with the tourist business. The good effects of the industry provide platforms and possibilities to improve opportunities for the engagement of local people. On the other hand, the negative effects of the industry result in a deterioration of the environment and culture of the destination.

In his article, "Tourist Techniques That May Offer Considerable Socioeconomic Benefits to Host Communities," **Ahmed** (2013) discusses tourism strategies that may bring the host community significant socially. The results of the tourist sector are not necessarily directed at alleviating poverty; rather, they are intended to assist the area in broad socioeconomic growth and to place a larger emphasis on alleviating poverty.

The study work of **Kumar Anjani Sudha** (2013) highlighted the revenues that an area receives from the ecotourism business as well as how the socioeconomic standing of a host community is changed by ecotourism promotion. As may be seen from previous encounters, ecotourism's foundational component is the destination communities themselves. They serve as the hub for the distribution of a variety of services, including information, transportation, catering, and lodging options.

Dayananda (2015) has shown that the tourist business is an effective instrument for the growth of the economy. Because India is so rich in historical and cultural sites, it is a popular tourist destination for people from all over the world. The extensive variety of flora and fauna in India draws visitors from all over the world throughout the whole year. As a result of the rise of the tourism sector, India has been able to attain a level of economic development that is satisfactory.

According to **Shiji** (2016), the development of tourism has a massive untapped potential to increase both the number of available jobs and the amount of money earned in foreign currency. It is an employment- and service-focused economy, and both public and commercial sectors, as well as nonprofit organizations, contribute significantly to India's economic growth. Charitable organizations also play an important part in this. Because of this, the government of India is making a concerted effort to focus on the growth of the tourism industry and has successfully linked all of the country's most popular tourist locations by road, rail, and air travel. There is a tremendous economic importance of the tourism sector in the prosperity of the nation, and the amount of foreign money created via tourism is continually growing from year to year.

In her research, **Kaur** (2017) expressed some trepidation about the holistic tourist development strategies. Because the facilities and infrastructure in Uttarakhand state are inadequate for the growth of tourism, and because of this, Uttarakhand state is unable to compete with surrounding nations and other states. There is a significant need for the development of infrastructural amenities such as transportation, roads, and guiding facilities, among other things. In addition to checking the seasonality element in tourist marketing and declaring that the aforementioned points need to be prioritized and enhanced, there is also a need to concentrate on the ones that were listed above. The Socio-Economic and Environmental Impacts of Tourism Development on the Dehradun District ecotourism strategy in addition to making extensive use of non-biodegradable trash as well as providing sufficient supply of municipal utilities.

It was stated by **Yameen et al.** (2019) that India's tourism industry should embrace and put into practise the worldwide tourism development standards and policies in order to promote holistic tourism in the country for the benefit of the people live at tourist destinations.

According to **Aanqa Moghal** et. al., (2022) both directly and indirectly, the tourism industry has a significant impact on the growth of the destination. Jammu and Kashmir's economic growth was evaluated in this study by looking at factors such as employment generation, infrastructure development, and regional growth. There was a positive and negative influence on the economy of the destination as a result of these variables. Because of this research, a lot of focus will be put on developing the state's unique tourism industry so that it can compete with the rest of India and the rest of the world for tourists' attention and dollars. This includes preserving and enhancing the state's cultural heritage and building new infrastructure.

3. OBJECTIVES OF THE STUDY

The Specific purpose of this study was to know the Impact of tourism on Socio – Economic status of people in Nilgiris District.

4. METHODOLOGY

One of the 38 districts that make up the Indian state of Tamil Nadu, which is located in southern India, is called the Nilgiris district. The Nilgiri Mountains are a mountain range that may be found on the boundaries of the Indian states of Tamil Nadu, Karnataka, and Kerala. This Nilgiris district is selected for the study purpose. Sample of 110 people was taken on the basis of convenience sampling technique to assess the impact level of tourism on socio economic status. The study is based on both primary data, Questionnaire tool is used to collect the needed primary data from the selected respondents. Percentage analysis is done for clear understanding of demographic profile of consumers and tourism and socio economic status of people in local areas. Impact of tourism on socio – economic status of people was analyzed through Normal Distribution (Z Test).

5. RESULTS

5.1 Demographic Profile of Consumers

Table-1: Demographic Profile of People

Demographic Profile	Frequency (n = 110)	%
Gender		
Male	69	62.72
Female	41	37.27
Age		
21 – 25 years	32	29.09
26 – 30 years	27	24.54
31 – 35 years	33	30.00
36 – 40 years	18	16.36
Education		
Secondary School	20	18.18
Higher Secondary	21	19.09
Under Graduation	47	42.72
Post Graduation	22	20.00
Marital Status		
Married	51	46.36
Unmarried	59	53.63
Source of Income		
Business Income	71	64.54
Salary	39	35.45
Amount Earned on a Monthly Basis		
Beneath Rs.30,000	62	56.36
Rs.30,001 – Rs.35,000	23	20.90
Rs.35,001 – Rs.40,000	14	12.72
Preceding Rs.40,000	11	10.00

Source: Computed from Primary Data

In Table-1, we see the demographics of Nilgiris residents. 30.00 percent of the population is between the ages of 31 and 35; 16.36 percent are between the ages of 36 and 40; 42.72 percent have a bachelor's degree; 18.18 percent have only finished Secondary school; 56.36 percent earn less than Rs.30,000 per month; and 10.00 percent earn more than Rs.40,000.

5.2. Tourism and Socio – Economic Status of People

Table 5.2.1 Tourist arrival increased your income

Opinion	Responses (in percentage)
Strongly Agree	29.00
Agree	44.00
Neutral	15.00
Disagree	12.00
Oppose strongly	10.00

Source: Computed from Primary Data

Table 5.2.1 depicts the views of local residents on the influx of visitors and the resulting rise in their income. 29 percent of the people polled said they were certain that the presence of tourists had a significant impact on their income. It was supported by 44% of tourists. One-fifth of those who took the survey said they were undecided. The remark was disputed with by 14% of those polled and only 10% strongly disagreed with it.

Chart 5.2.1
 Tourist arrival increase your income

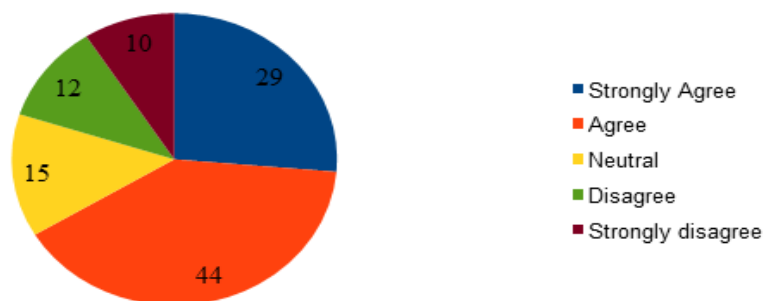


Table 5.2.2 Type of Tourist visits your area

Opinion	Responses (in percentage)
Nature lovers	30.00
Adventurers	20.00
For Study purpose	12.00
Honey moon couples	35.00
Culture & pilgrimagers	13.00

Source: Computed from Primary Data

Fig. 5.2.2 displays the views of local residents on the sort of tourists who visit their region of choice. Honeymooners account for 35% of all visitors. Naturalists make about 30% of visitors to the area. Adventurers make up 20% of the population. Thirteen percent and twelve percent of visitors to the Nilgris region come for cultural and religious pilgrimages and academic pursuits, respectively.

Chart 5.2.2
 Type of Tourist visits your area

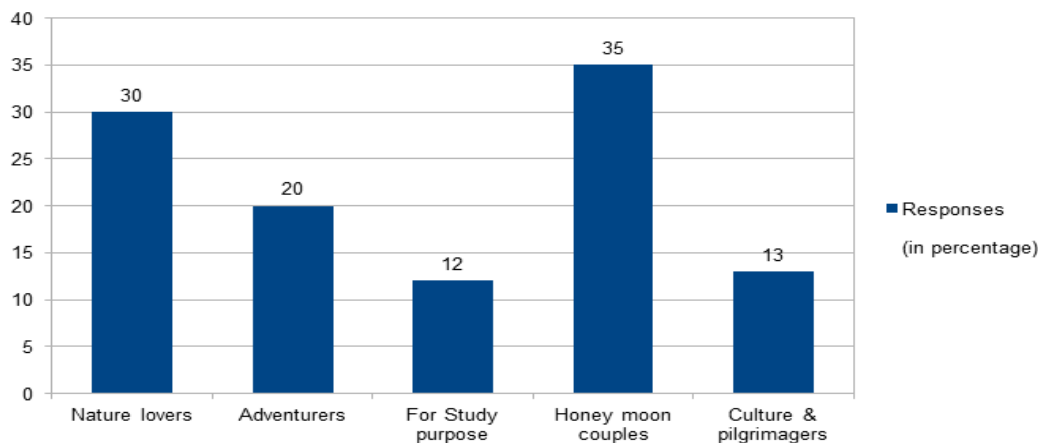


Table 5.2.3 Creation of employment opportunity for local people

Opinion	Responses (in percentage)
Strongly Agree	17.00
Agree	59.00
Neutral	12.00
Disagree	12.00
Strongly disagree	10.00

Source: Computed from Primary Data

It is seen in Table 5.2.3 that people's views on job creation due to tourist visits are mixed. It was found that 17 percent of the sample respondents strongly agreed that job chances were established as a result of tourist visits. It was supported by 59 percent of tourists. Of those who took the survey, 13% expressed no opinion. The remark was disputed with by 14% of those polled and only 10% strongly disagreed with it.

Chart 5.2.3
 Creation of employment opportunity for local people

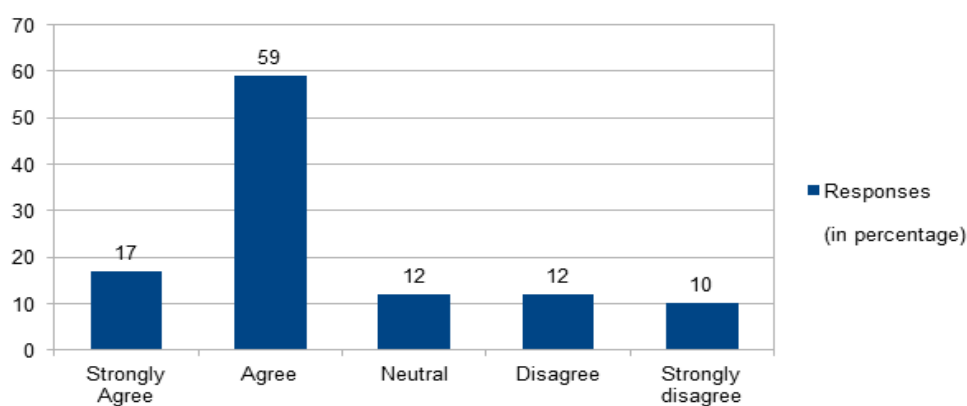


Table 5.2.4 Tourism improved accommodation facilities in local areas

Opinion	Responses (in percentage)
Strongly Agree	11.81
Agree	54.54
Neutral	17.27
Disagree	10.90
Strongly disagree	5.45

Source: Computed from Primary Data

In Table 5.2.4, we can see what individuals think about the improvement in lodging options in the local region owing to tourism. A whopping 11.81 percent of those polled said they were certain that tourism was to blame for the improvisation in local lodgings. A whopping 54.54 percent of tourists agreed. Of those who took the survey, 17.27% said they were unsure. Only 5.45 percent of those polled strongly disagreed with the assertion, which was disputed by 10.90 percent of those polled.

Chart 5.2.4
 Tourism improves accommodation facilities in local areas

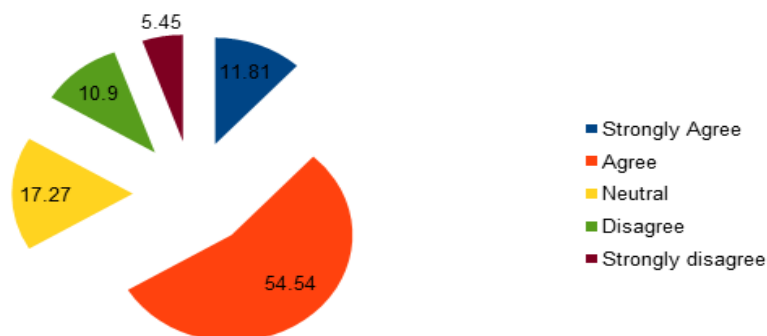


Table 5.2.5 Tourism improve standard of living of people in local areas

Opinion	Responses (in percentage)
Strongly Agree	13.63
Agree	55.45
Neutral	13.63
Disagree	10.90
Strongly disagree	6.36

Source: Computed from Primary Data

Table 5.2.5 depicts the public's belief that tourism enhances local residents' quality of life. People in local communities benefit from tourism, according to 13.63 percent of those surveyed. It was endorsed by 55.45% of the tourists. While 13.63 percent of those polled said they were unsure of their position, the rest were split down the middle. The remark was highly disagreed with by just 6.36 percent of those polled, with 10.90% strongly disagreeing.

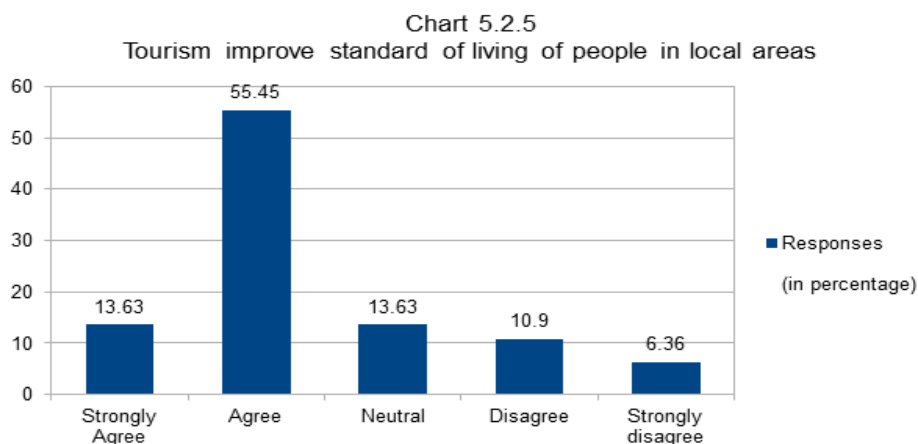


Table 5.2.6 Literacy rate increased due to tourism

Opinion	Responses (in percentage)
Strongly Agree	15.40
Agree	66.00
Neutral	19.80
Disagree	13.20
Strongly disagree	6.60

Source: Computed from Primary Data

According to Table 5.2.6, local residents believe that tourism has a positive impact on literacy rates in their communities. 15.40 percent of those polled said they were absolutely certain that tourism raises literacy levels in the communities where it occurs. It was supported by 66% of the visitors. While 19.80 percent of those polled said they were neither in agreement nor disagreeing. Only 6.60 percent of those polled strongly disagreed with the assertion, which was disputed by 13.20 percent of those polled.

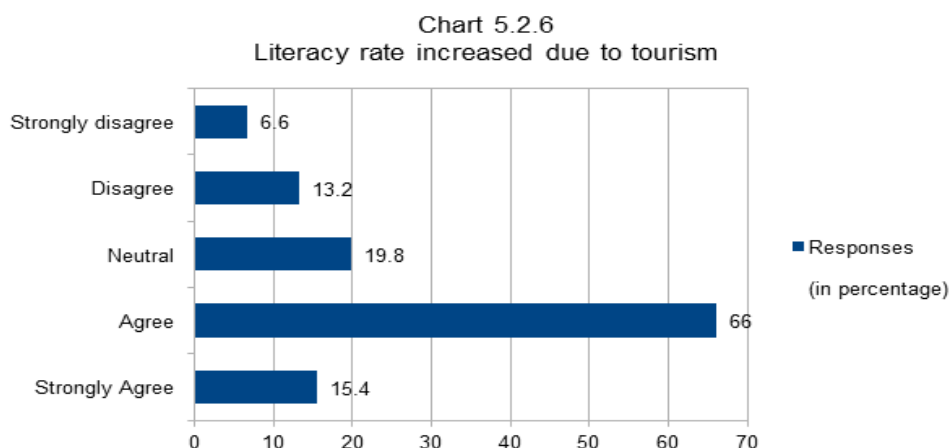


Table 5.2.7 Tourism increases use of technology

Opinion	Responses (in percentage)
Strongly Agree	18.18
Agree	50.90
Neutral	12.72
Disagree	10.90
Strongly disagree	7.27

Source: Computed from Primary Data

Table 5.2.7 depicts locals' thoughts on how tourism affects their use of technology. 18.18 percent of the survey participants strongly agreed that tourism promotes the use of technology in the local community. It was supported by 50.90% of the tourists. In contrast, 12.72 percent of those polled said they were unsure or undecided. It was found that 10.90 percent of the people surveyed disagreed with the statement, although only 7.27 percent of those surveyed strongly disagreed with it.

Chart 5.2.7
 Tourism increases usage of technology

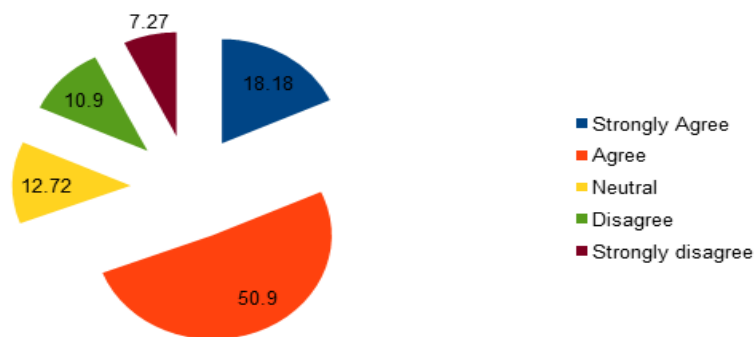


Table 5.2.8 Tourism increase women's involvement at social level

Opinion	Responses (in percentage)
Strongly Agree	19.09
Agree	60.90
Neutral	11.81
Disagree	8.20
Strongly disagree	0.00

Source: Computed from Primary Data

Tourists believe that women's social participation is bolstered as seen in Table 5.2.8. According to our survey results, 19.09 percent of women strongly agreed that travel and tourism boost their social participation. 60.90 percent of the visitors agreed with this statement. While just 11.81 percent of those polled said they were unsure about their position. Respondents were 8.20 percent opposed and none of them were extremely opposed to the remark.

Chart 5.2.8
 Tourism increase women's involvement at social level

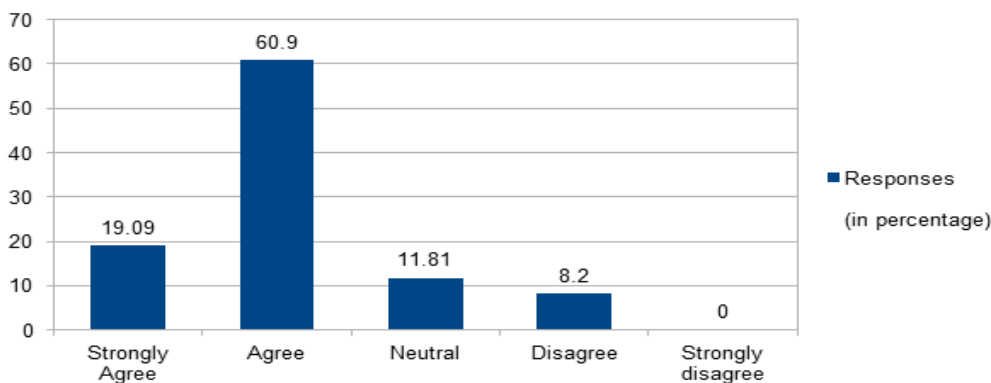


Table 5.2.9 Tourism increases Entrepreneurship

Opinion	Responses (in percentage)
Strongly Agree	15.45
Agree	54.54
Neutral	18.18
Disagree	10.00
Strongly disagree	0.00

Source: Computed from Primary data

Table 5.2.9 shows the perception of local residents that tourism boosts local entrepreneurship. 15.45 percent of the survey participants strongly agreed that tourism boosts local entrepreneurship. 54.54% of the visitors were in agreement with this statement. While 18.18 percent of those polled were undecided. 10% of respondents disagreed with the remark and none of the respondents strongly disagreed with it, according to the survey.

Chart 5.2.9
 Tourism improves Entrepreneurship in local areas

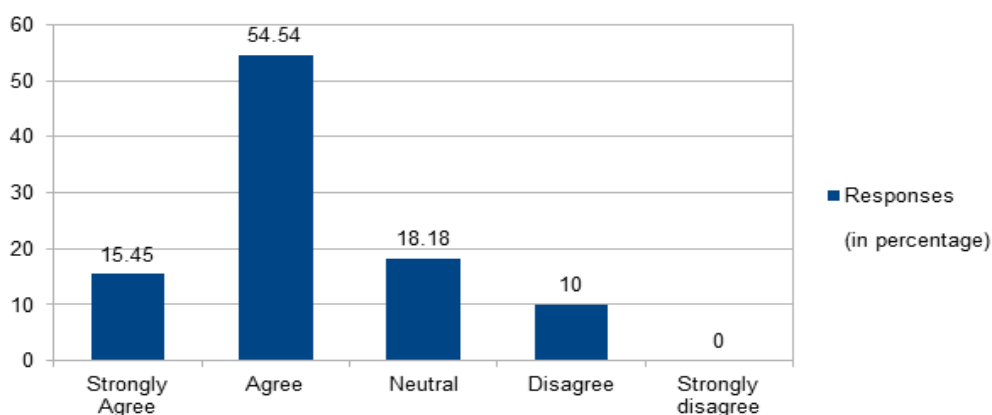


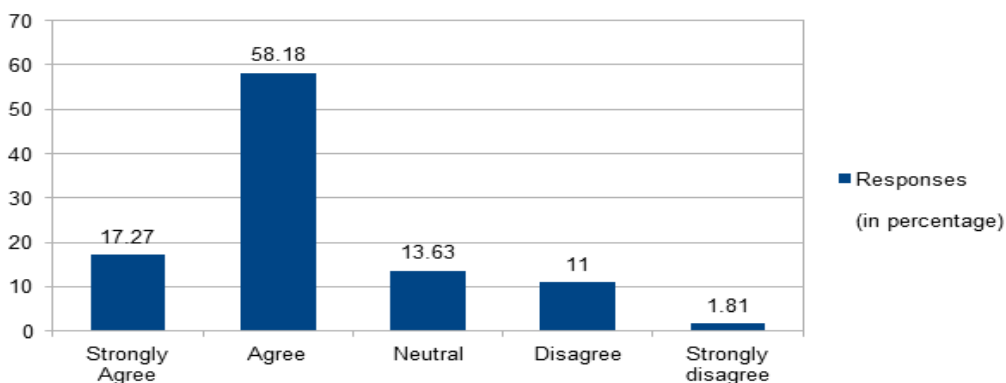
Table 5.2.10 Tourism improves public health, hygiene and sanitation

Opinion	Responses (in percentage)
Strongly Agree	17.27
Agree	58.18
Neutral	13.63
Disagree	11.00
Strongly disagree	1.81

Source: Computed from Primary data

This table reflects the perception of locals that tourism helps public health, hygiene and sanitation. 17.27 percent of respondents strongly agreed that tourism helps public health, hygiene, and sanitation in the local region. It was endorsed by 58.18 percent of the visitors. While 13.63 percent of those polled said they had no opinion. Only 1.81 percent of the respondents strongly disagreed with the statement, with 11.00 percent disagreeing.

Chart 5.2.10
 Tourism improves public health, hygiene and sanitation



5.3 Impact of Various Types of Tourism on Socio – Economic Status of People

5.3.1 H0- Natural Tourism has impact on Socio Economic Status of people on local area of Nilgris district.

H1 - Natural Tourism has no impact on Socio Economic Status of people on local area of Nilgris district.

Parameter	N	Mean	S.D	Z
Natural Tourism	110	3.72	0.71	-1.42

Source: Computed from Primary data

The Z value shows that there was a positive impact of Natural tourism on Socio economic status of people in Nilgris district. Thus null hypothesis (H0) is accepted.

5.3.2 H0- Adventure Tourism has impact on Socio Economic Status of people on local area of Nilgris district.

H1 - Adventure Tourism has no impact on Socio Economic Status of people on local area of Nilgris district.

Parameter	N	Mean	S.D	Z
Natural Tourism	110	3.24	0.59	-0.58

Source: Computed from Primary data

The Z value shows that there was a positive impact of Adventure tourism on Socio economic status of people in Nilgris district. Thus null hypothesis (H0) is accepted.

5.3.3 H0- Pilgrim Tourism has impact on Socio Economic Status of people on local area of Nilgris district.

H1 - Pilgrim Tourism has no impact on Socio Economic Status of people on local area of Nilgris district.

Parameter	N	Mean	S.D	Z
Natural Tourism	110	3.74	0.77	-1.55

Source: Computed from Primary data

The Z value shows that there was a positive impact of Pilgrim tourism on Socio economic status of people in Nilgris district. Thus null hypothesis (H0) is accepted.

6. PROBLEMS AND SUGGESTIONS

Tourism plays a major role in developing the socio economic status of the people in Nilgris district. It shows a positive impact over the people's life in local area i.e., Nilgris district. So it is the duty of the local authority has to focus on various on developmental activity at the local area and it will surely show progress in the socio economic status of the local people.

7. CONCLUSION

Attracting and hosting tourists is a complex process that involves a wide range of stakeholders, including travellers, suppliers, host governments, host communities, as well as the immediate environment. This is where the term "tourism" comes into play. For example, poverty reduction, environmental protection, and the creation of job opportunities for disadvantaged populations may all be achieved via the tourist industry. Tourism has long been recognized as a source of government income and foreign currency gains in the extant literature. The multifaceted nature of the tourist industry means that it produces cash and provides jobs in a wide range of industries. National Strategy for Tourism Development was developed in 1996 in an effort to maximize the economic impact of tourism on India's overall growth and development. Accordingly, a national tourist development policy has been devised in order to maximise the direct and multiplier impacts of tourism on employment and poverty alleviation in an ecologically friendly way. 'National Tourism Development Policy' To promote the tourism industry in Nepal, the seven most important aspects, namely, Swagat (Welcome), Soochna (Information), Suvidha (Facilitation), Suraksha (Safety), Sahyog (Cooperation), Samrachna (Infrastructure Development) and Safai were emphasized. So it is the duty of the local authority who enjoys the income of tourism in local areas. If the local authority and government focus on the above mentioned aspects surely yields better results in the near future over the lives of people in local areas.

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Study of Chromatographic and Spectral Analysis of *Mimusops elengi* L. Bark

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ABSTRACT

Present study taken to investigate the chromatographic and spectral analysis of the *Mimusops elengi* L. plant. Extraction was carried out with the help of organic solvent and soxhlation technique. Methanol was used as solvents. Plant quality analysis was performed using standard chemical methods. The results show that the presence of steroids, carbohydrates, phenolic compound, tannin, flavonoids and saponins was found in plant extracts. The analysis was carried out by HPTLC, UV and IR. Result indicates the potency of the drug.

Keywords: Phytochemical study, *Mimusops elengi* (L.) bark, spectroscopy, chromatography etc.

1. INTRODUCTION

The family Sapotaceae comprises 35 – 75 genera and approximately 800 species distributed pantropically with a few species in temperate regions. The genus *Mimusops* is native to the tropical parts of Africa and Asia. *Mimusops elengi* L. is an evergreen tree 30 feet tall, with a greyish brown fissured bark, wavy and dull green leaves, oblong berry fruit and creamy fragrant flowers. It is distributed in tropical and subtropical regions. *M. elengi* is known to possess various phytochemicals such as gallic acid esters, flavones, triterpenoids and steroids. The volatile constituents of the flowers have also been reported. Different parts of the plant are reported to be used in traditional medicine for the treatment of microbial diseases such as diarrhoea, gum diseases, sore mouth, stomachs, ulcers, wounds and inflammation [(Kirtikar,1998), (Rastogi,1960)].

2. MATERIALS AND METHODS

2.1. Plant Material

The plant material *Mimusops elengi*. (Sapotaceae) bark is collected in the local area of Dhule district, MS, India. The planting material was clean and dry. It was also identified and validated by the Department of Botany, Shri Shivaji Vidya Prasarak Sansthas's Late K. Dr. P. R. Ghogarey Science College, Dhule (Maharashtra).

2.2. Preparation of the Extract

Dried bark converted into powder after drying and then stored in a sturdy air container at room temperature. The extraction method was based on the presence of active drug components, using solutions. Dry powder was extracted in methanol using a soxhlation method. The discharge was centered on the stand by simply removing the solvent at low temperatures using a rotating evaporator. The discharge was stored in an airtight container.

2.3. Chromatographic Separation

[(Wagner, 2007), (Egon, 2007), (Rangari, 2012)]

2.3.1 Thin Layer Chromatography

Methanolic extract were evaluated by thin layer chromatography to identify the presence of number of phytoconstituents present in extract using specific solvent system and detecting reagents, which was found to give proper separation.

2.3.2 High Performance Thin Layer Chromatography (HPTLC)

The well-developed quality standards can be achieved only through systematic evaluation of the plant material using modern analytical chromatographic techniques. thin layer chromatography and high performance thin layer chromatography are methods commonly applied for the identification, assay and the testing of purity, stability, dissolution or content uniformity of raw materials and formulated products..

Reagents and Other Materials

Standard Quercetin, Gallic acid, toluene, ethyl acetate [all reagents of analytical grade, [E-Merck] and silica gel 60 F 254 precoated thin layer chromatography aluminum plates [E-Merck].

APPARATUS

Spotting Device: Linomat V Automatic Sample Spotter; CAMAG (Muttentz, Switzerland)

Syringe: 100µL Hamilton (Bonadzu, Switzerland)

Thin layer chromatography (TLC) Chamber: Glass with trough chamber (20×10 ×4 cm) (CAMAG)

Densitometer: Thin layer chromatography scanner 3 linked to Win Cats Software (CAMAG)

High Performance Thin Layer Chromatography Plates:

Identification and determination of the drug was performed on (10 cm × 10 cm. layer thickness 0.2 mm, E-Merck, Darmstadt, Germany) aluminum backed silica gel 60 F₂₅₄ TLC plates, pre-washed with methanol.

Selection and Optimization of Mobile Phase

Toluene: Ethyl acetate: Formic Acid, the mobile phase consisting of (5:4:1) (v/v) gave good resolution.

Ferric chloride as staining reagent.

Preparation of Standard and Sample Solutions

1) Preparation of Sample Solutions.

Sample solution was prepared by dissolving 10 mg of Methanolic extracts of plant *Mimusops elengi* in Methanol and making up the volume to 10 ml.

2) Standard Solution of Quercetin

The quercetin stock solution was prepared by dissolving 5 mg and 1 mg of well-balanced quercetin in methanol and creating a volume up to 10 ml with methanol to obtain a final concentration of 500 µg / ml and 100 µg / ml.

2.4 Column Chromatography

Column chromatography is one of the most useful methods of separation and purification of solids and liquids. Column chromatography is another solid liquid process in which both phases are solid (vertical) and liquid (Phase).

Isolation of Phytoconstituent from Solvent Ether Soluble Fraction by Column Chromatography

Isolation of phytoconstituents was carried out on Solvent ether soluble fraction of methanolic extract of *Mimusops elengi*, as the particular fraction revealed compound.

Absorbent: Silica gel 60-120.

Column Dimension: Length -45cm, Diameter-2.2 cm.

Packed Adsorbent Length: 26cm

Elution Rate: 5-6 drops/min

Volume of Elute Collected: 20ml

Sample Preparation

20 ml of solvent ether soluble fraction of methanolic extract was mixed well with 20 gm silica gel and at 45°C dried in vacuum oven. The adsorbed material transferred to the column.

Preparation of Column

150 gm of silica gel for column chromatography was activated in hot air oven at 110°C for 1hr. The adsorbed bed was developed in mobile phase which was initially packed with glass wool. The glass wool is trimmed at the bottom of the column. The activated silica slurry was made in Toluene: Ethyl acetate: Formic Acid (5: 4: 1) and applied to the column in small portions by keeping the buttocks open with a small tap after each installation to ensure uniform packaging. Then fractions collected with eluted mobile phase. Fractions collected were further concentrated. Each fraction was evaluated by thin layer chromatography to detect the number of phytoconstituents present in it.

Thin Layer Chromatography of Isolated Fraction after Column Chromatography:

Stationary Phase : Silica gel G

Mobile Phase ; Toluene: Ethyl acetate: Formic Acid

Proportion : 5: 4: 1

2.5 SPECTROSCOPIC ANALYSIS

2.5.1 Ultraviolet Spectrophotometer (U.V. Spectrum):

The solution of parts per million (ppm) was prepared. Isolated fraction compound and shimadzu 1800 UV Spectrophotometer with 1cm matched quartz cells was used to obtain U.V Spectrum of isolated fraction compound.

2.5.2 Fourier Transform Infrared Spectroscopy (Ftir):

FTIR has proven to be available tool for the characterization and identification of compound functional groups (chemical bonds) present in an unknown mixture of plant extract.

3. RESULTS

3.1 Chromatographic Studies

3.1.1 Thin Layer Chromatography of Methanolic Extract of Bark of *Mimusops Elengi*

Silica gel G used as Stationary phase, Toluene: Ethyl acetate: Formic Acid (5:4:1) as mobile phase.

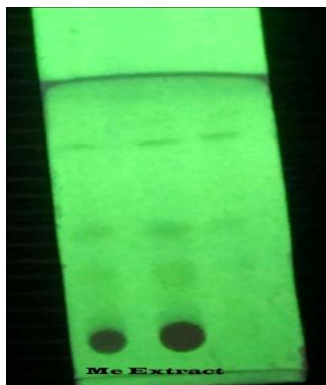


Fig 3.1: Under UV cabinet at 254nm

A:-Spot of Standard Quercetin

B: -Spot of Methanolic extract of plant *Mimusops elengi*

3.1.2 High Performance Thin Layer Chromatography (HPTLC)

Stationary Phase : Silica gel G pre coated plate.

Mobile Phase : Toluene: Ethyl acetate: Formic Acid

Proportion : 5:4: 1

Detection : under U.V. cabinet at 254nm

Solvent Front : 10 cm

No of Tracks : 12

HPTLC Plate of Methanolic Extract Compared with Standard Gallic Acid and Quercetin.

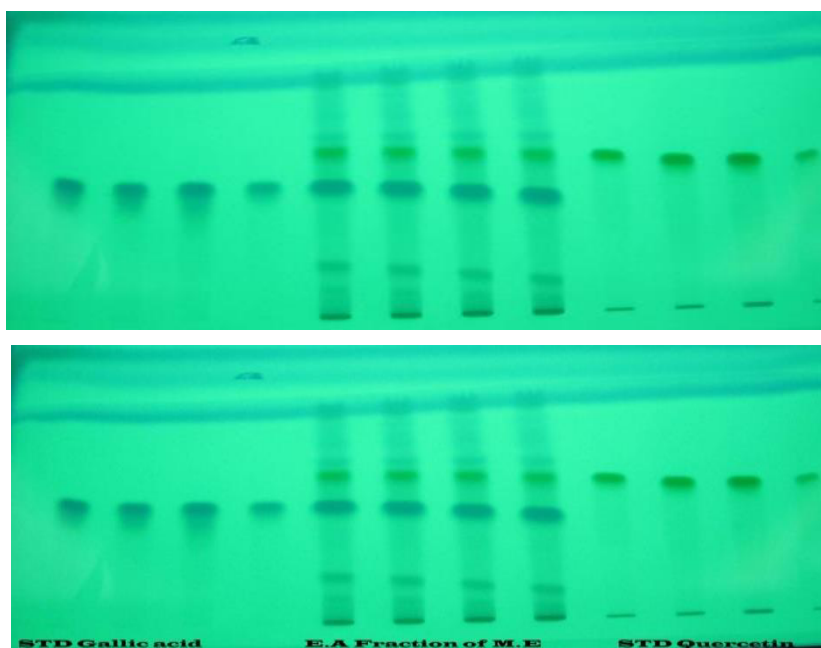


Fig. 3.2: HPTLC Plate on U.V at 254 nm.

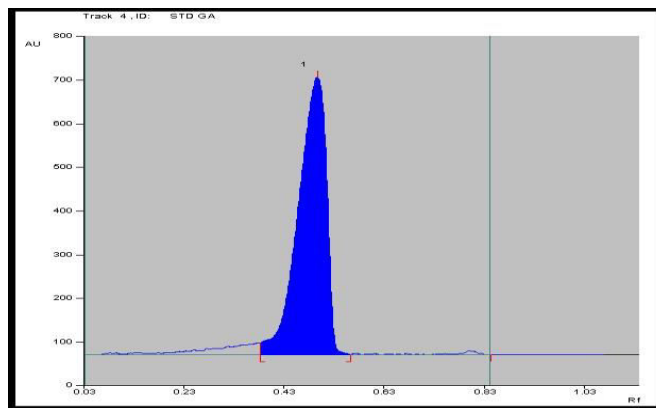


Fig. 3.3: HPTLC Chromatogram of Gallic acid

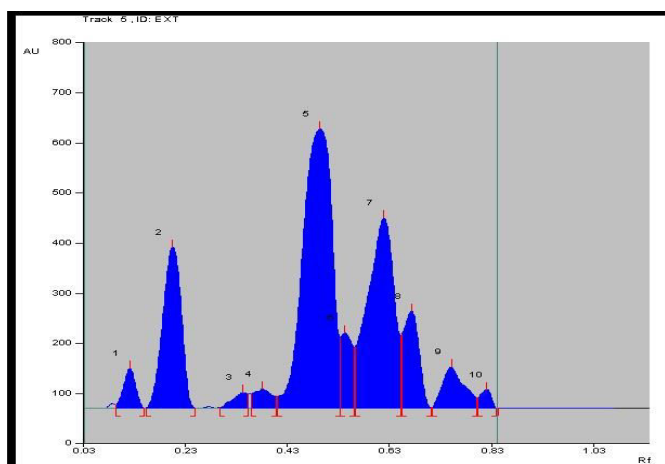


Fig. 3.4: HPTLC Chromatogram for Extract

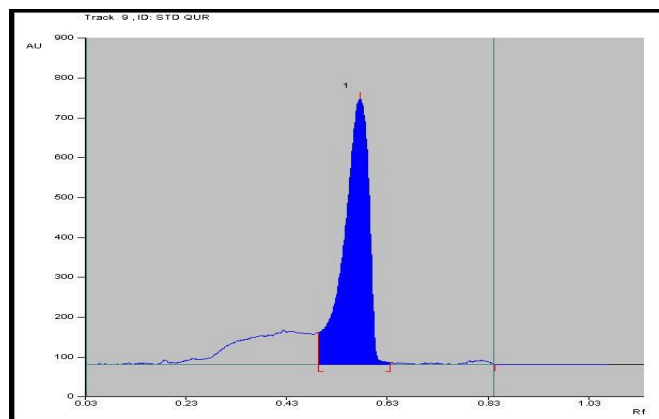


Fig. 3.5: HPTLC Chromatogram of Std. Quercetin

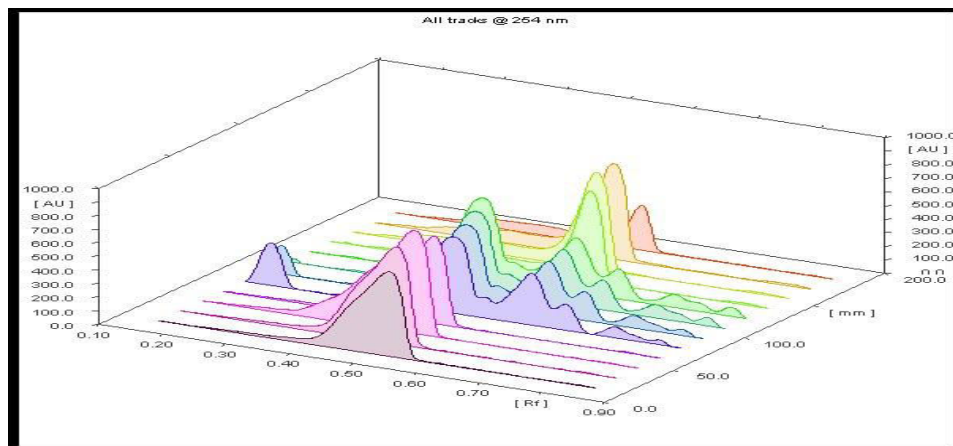


Fig. 3.6: 3D image of all tracks of STD gallic acid, extract & quercetin at 254 nm.

3.2 COLUMN CHROMATOGRAPHY

Separation of phytoconstituent from ethyl acetate soluble fraction of methanolic extract by column chromatography:

After column chromatography all isolated fraction are evaluated by Thin layer chromatography. All fractions showed two spots on TLC plates.

Fractions	No of spots	Color	R _f Values
1-3	No spot	-	-
4-6	Two spots	Blue & yellowish green	0.50 & 0.62
7 – 9	Two spots	Blue & yellowish green	0.52 & 0.63
10 – 15	Two spots	Blue & yellowish green	0.49 & 0.61
16 – 18	Two spots	Blue & yellowish green	0.50 & 0.61
19- 55	No spots	-	-

Table 01: Details of the fraction eluted by column chromatography.

TLC of Isolated Fraction

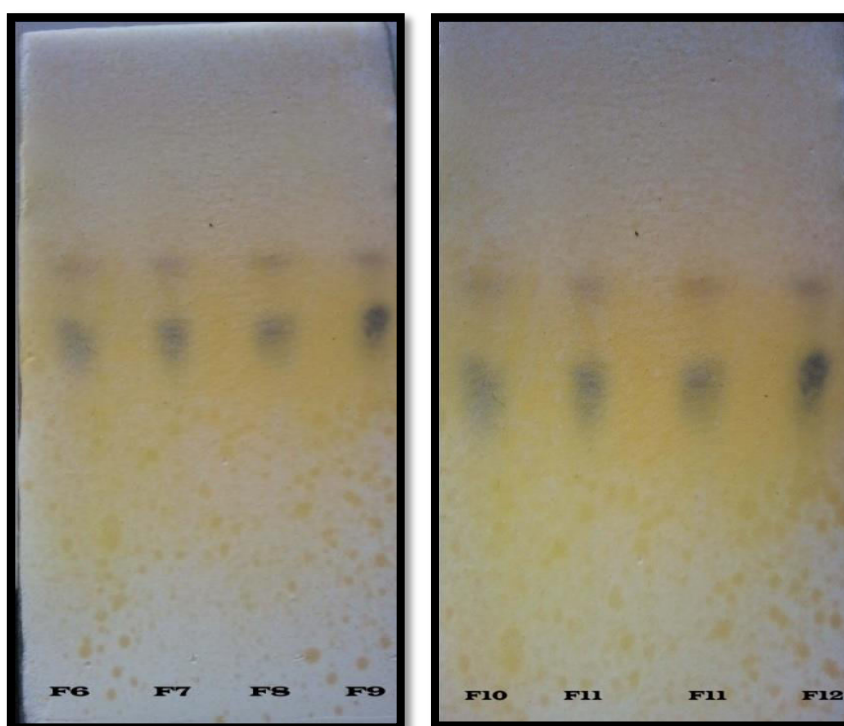


Fig. 3.7: TLC Of isolated fraction by column chromatography.

Recolumn: All fractions showed two spots on TLC plates hence all fractions are collected and prepared for recolumn.

TLC evaluation of isolated fraction after recolumn:

Stationary phase : Silica gel g.

Mobile phase : Toluene: Ethyl acetate: Formic acid

Proportion : 5: 4 : 1

Detection : U.V - 254

Data for Column Eluents of Solvent Ether Fraction

Fractions	No of spots	Colors	R _f Values
1-4	No spots	-	-
6-12	1 spots	Yellowish green	0.61
13-18	2 spots	Yellowish green	0.61

Table 02: Details of fraction eluted by recolumn.

Chemical Test of Isolated Compound

Chemical test	Observation	Inference
Sodium Hydroxide	Decoloration	Flavonoids may be present

Table 03: Chemical examination of isolated compound – A



Fig.3.8: TLC of isolated fraction after recolumn.

Yield of Isolated Compound

Isolated compound	Yield from column
Compound-A	60mg

Table 04: Yield of isolated compound after recolumn

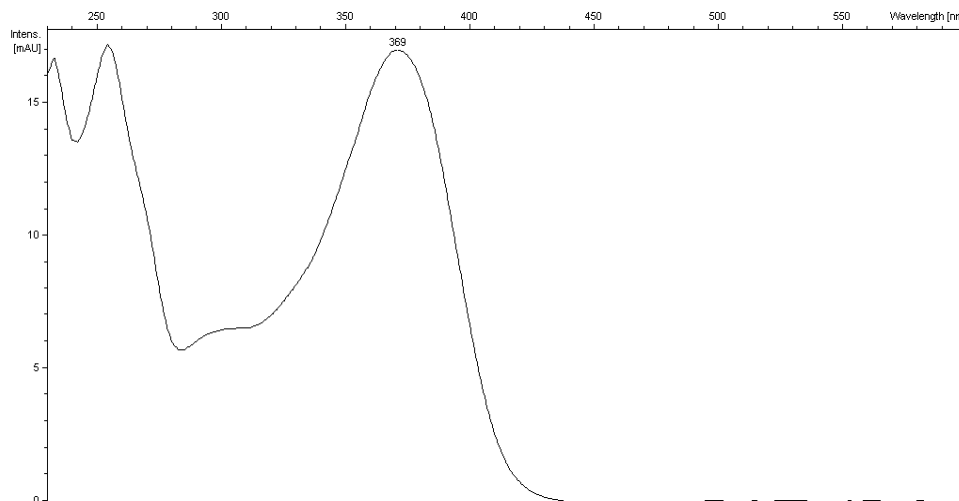
Parameters of Isolated Compound

Parameters	Compound
Physical state	Solid crystalline
Color	Yellowish green
Solubility	Methanol
Melting point	215-218°C

Table 05: Physical parameters of isolated compound

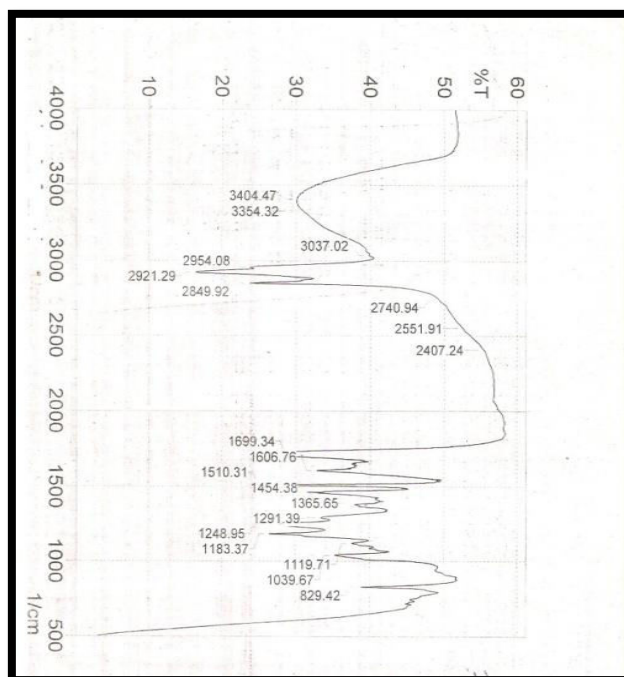
3.3 SPECTRAL ANALYSIS

3.3.1 U.V Spectra



Graph No. 1: U.V spectra of isolated compound

3.3.2 FT-IR:



Graph No.2: FT-IR Spectra of isolated compound

Characterization of Isolated Compound

Spectra	Characters
U.V	Two peak with λ max at 255 & 369nm
FT-IR	Peaks at following wave number are observed Wave number(cm^{-1})
	3037.02 C-H Stretching
	1699.34 C=O Stretching
	3354.32 O-H Stretching
	1606.76 C=C Stretching
	1291.39 O-H bending
	1119.71 C-O-C Stretching

Table 06: Characterization of Isolated compound

4. DISCUSSION AND CONCLUSION

Toluene: Ethyl acetate: Formic acid (5: 4: 1) as mobile phase gave the best resolution of gallic acid and quercetin (RF value =0.57 & 0.63) respectively. As the ethyl acetate soluble parts of methanolic extract of bark of plant *Mimusops elengi*.

The TLC plate was visualized under UV light at 254 nm, without derivatization. A photograph of a TLC plate after chromatography of standard gallic acid & quercetin and a Ethyl acetate soluble parts of methanolic extract of the bark of the *Mimusops elengi* are shown in fig. The identity of bands of gallic acid & quercetin in plant extract was confirmed by overlay in U.V absorption spectra with compare of standard gallic acid & quercetin by using CAMAG TLC scanner.

The purity of band of gallic acid & quercetin in plant extract was confirmed by overlaying the absorption spectra of start, middle, & end position of band. The linearity for standard gallic acid & quercetin (10 $\mu\text{g/ml/spot}$) and for extracts also (10 $\mu\text{g/ml/spot}$). The RF value of Gallic acid & Quercetin in plant extract is (0.56 & 0.65) respectively.

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Review of Psychoneuroimmunology and Endocrine System in Disease Development

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ABSTRACT

Psychoneuroimmunology is a branch of Psychology, Which originated in the 1970s. It deals with relationship between Central Nervous System, Peripheral Nervous System, Endocrine System and Immunity. Continuous research is being done in this since 1970. On the basis of this, cancer, fatigue, frustration, AIDS, sleep disorders are being successfully treated. It explains the relationship between immunity and the endocrine system. The brain and the immunity are not fully formed at birth. Rather, they both emerge from fetal life with a littlest set of functions that enable newborns' adaptation to a limited number of expected stimuli. It also affect by the environment. Here it will discuss about evidence suggesting that early experiences are also important to set up long-term patterns of interaction between the brain and the immune system.

Keywords: Psychoneuroimmunology, Endocrine system, CNS, ANS, Immune Function, Stress, Mental State.

INTRODUCTION

'Psychoneuroimmunology' term was given by Robert Ader and Nicholas Cohen, at the University of Rochester, in 1975. It is a branch of Psychology. It explains about the linkup between the mind, the brain and the immune function. Psychoneuroimmunology is a form of psychoneuroendocrinology, in which it has been described that study of the interlinkage between psychological processes and the nervous and immune systems of the human body. It is the study of the relation among behavioral system, neural function, endocrine system, and immune processes. Brain communicates with our immune system through Autonomic Nervous System and Neuroendocrine Activity (<https://en.wikipedia.org/wiki/Psychoneuroimmunology>).

ORGIN

In the 1970s, Hugo Besedovsky, Adriana del Rey and Ernst Sorkin, conducting a study in Switzerland, reported multi-directional immune-neuro-endocrine interlinkage, since they defined that not only the brain but also the immune response itself can affect the brain and neuroendocrine Function. They found that the immune react to non-injurious antigens triggers an increase in the function of hypothalamic neurons and hormonal and autonomic nerve responses that are relevant for immune-regulation and are merged at brain levels. On these bases, they suggest that the immune function acts as a sensorial receptor organ that, besides its peripheral effects, can communicate to the brain and associated neuro-endocrine structures its state of activity. Robert Ader and Nicholas Cohen had conducted a study about immune function, which is based on Pavlov's classical conditioning in 1975, at the University of Rochester. This was one of the first experimental study that demonstrated that the nervous system can affect the immune system ([https:// en.wikipedia.org/ wiki/ Psychoneuroimmunology](https://en.wikipedia.org/wiki/Psychoneuroimmunology)).

In 1981, David L. Felten, working at the Indiana University School of Medicine, and his colleague JM Williams, had also found nerves in the thymus and spleen discontinuing near clusters of lymphocytes, macrophages, and mast cells, all of these help to control immune system. This extreme discovery provided one of the first indications of how neuro-immune interaction arises. Ader, Cohen, and Felten went on to edit the unconventional book Psychoneuroimmunology in 1981, which later proved to be a milestone about the study of the brain and immune system represent a single, integrated system of defense ([https:// en.wikipedia.org/ wiki/ Psychoneuroimmunology](https://en.wikipedia.org/wiki/Psychoneuroimmunology)).

Endocrine System

Endocrine system is made up of several organs that called glands. These glands, located all over the body, and produce release hormones. It is also called ductless hormonal function. Hormones are chemicals that coordinate different types of functions in body by carrying messages through blood to organs, skin, muscles and other tissues. These signals tell to body what to do and when to do it. Endocrine system is the part of ANS (Autonomic Nervous System), which regulates though CNS (Central Nervous System) ([https:// my.clevelandclinic.org/ health/articles/21201-endocrine-system](https://my.clevelandclinic.org/health/articles/21201-endocrine-system)).

Endocrine system continuously monitors the amount of hormones in blood. Hormones deliver their signals by locking into the cells they target so they can relay the message. The pituitary gland senses when hormone levels

rise, and instruct other glands to stop creating and releasing hormones. When hormone levels dip below a certain point, the pituitary gland can indicate other glands to produce and release more. This process, called homeostasis, works similarly to the thermostat in house. Hormones affect nearly every process in body, including (<https://my.clevelandclinic.org/health/articles/21201-endocrine-system>):

- Metabolism.
- Growth and development.
- Emotions and mood.
- Fertility and sexual function.
- Sleep.
- Blood pressure.
- Eating

Parts of Endocrine System

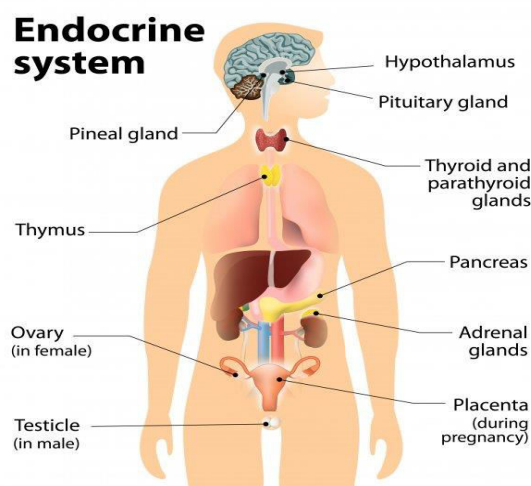
The endocrine system is build up of organs called glands. Glands produce and release different types of hormones that target specific things in the body. Glands are all over in body, including in brain, neck, stomach, kidneys and reproductive organs. Some glands are very small, about the size of a grain of rice or a pea. Pancreas is the largest gland, which is long about 6 inches ([https:// my.clevelandclinic.org/ health/articles/ 21201-endocrine-system](https://my.clevelandclinic.org/health/articles/21201-endocrine-system)).

The Main Glands that Released Hormones Include

- **Hypothalamus:** This gland is located in brain and controls all over endocrine system. It uses information from nervous system to determine when to instruct other glands, including the pituitary gland, to produce hormones. The hypothalamus controls many processes in body, including mood, emotions, hunger, thirst, sleeping patterns and sexual function.
- **Pituitary:** This little gland is only about the size of a pea, but it has done big job. This is also called master gland. It produces hormones that control several other glands such as the thyroid gland, adrenal glands, ovaries and testicles. The pituitary gland is responsible for many different functions in body, including how body grows. It is also called growth hormone.
- **Thyroid:** thyroid gland is a butterfly-shaped gland in the front of neck. It's responsible for metabolism (how body uses energy).
- **Parathyroid:** These four little glands are no larger than a grain of rice. They control the level of calcium in body. For working heart, kidneys, bones and nervous system in proper way, need right amount of calcium. It is fulfill the need of calcium level in body.
- **Adrenal:** There are two adrenal glands in body, one on top of each kidney. They command metabolism, blood pressure, sexual development and response to stress.
- **Pineal:** This gland manages sleeping pattern by releasing melatonin, a hormone that causes anybody to feel sleepy.
- **Pancreas:** Pancreas is part of your endocrine system, and it plays a significant role in digestive system too. It makes a hormone called insulin that controls sugar level in blood.
- **Ovaries:** In female, the ovaries produce sex hormones called estrogen, progesterone and testosterone. Female have two ovaries in their lower abdomen.
- **Testes:** In male, the testes (testicles) make sperm and release the hormone testosterone. This hormone impact on sperm production, muscle strength and sex drive ([https:// my.clevelandclinic.org/ health/articles/21201-endocrine-system](https://my.clevelandclinic.org/health/articles/21201-endocrine-system)).

Following figure indicates where are Endocrine Glands Located in the Human Body ([https:// www.epa.gov/ endocrine-disruption/what-endocrine-system](https://www.epa.gov/endocrine-disruption/what-endocrine-system))

Figure: 1



Immune System Development

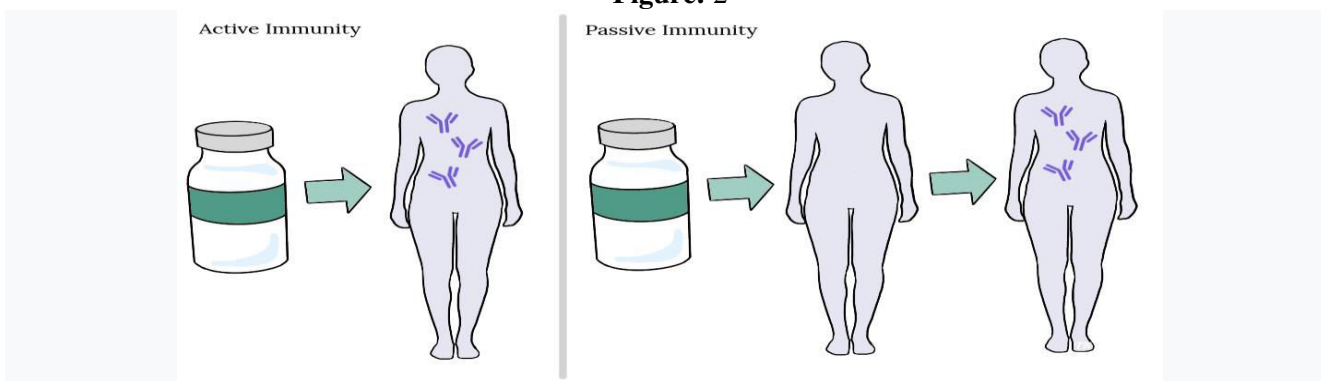
Immunity means, the body's ability to fight diseases. Every day the individual comes in contact with different types of viruses, bacteria etc. There are antigens on the surface of the skin, which prevent these bacteria and viruses from entering the body. These antigens also protect the body by developing the body's defense system to fight those bacteria and viruses and for the body's immunity ([https:// ecampusontario. pressbooks.pub/ immunizations](https://ecampusontario.pressbooks.pub/immunizations)).

There are several types of immunity, such as innate, passive and acquired/active immunity system. The active immune system starts functioning as soon as a germ or a virus or bacteria is attacked in body. In passive immunity, immunity is taken antibodies from another person (<https:// ecampusontario. pressbooks.pub/ immunizations>).

Innate Immunity: - It is innate immune in the individual. A person is born with, including physical barriers (skin, body hair), defense mechanisms (saliva, gastric acid), and general immune responses (inflammation). It works quickly to protect against germs. It works quickly to protect against germs, virus, bacteria etc (<https://ecampusontario.pressbooks.pub/immunizations>).

Passive Immunity: - It is the body's capacity to resist pathogens by "borrowing" antibodies. For example, antibodies can be transferred to a baby from a mother's breast milk, or through blood products containing antibodies such as immunoglobulin that can be transfused from one person to another. The most common form of passive immunity is that which an infant receives from its mother. Antibodies are transported across the placenta during the last one to two months of pregnancy. As a result, a full-term infant will have the same antibodies as its mother. These antibodies will protect the infant from certain diseases for up to a year, and act to defend against specific antigens. Although beneficial, passive immunity is temporary until the antibodies are gone (wane), since the body has not produced the antibodies (<https:// ecampusontario. pressbooks.pub/ immunizations>).

Figure: 2



Active vs. Passive Immunity (<https://ecampusontario.pressbooks.pub/immunizations/chapter/what-is-immunity/>)

Inflammation and Psychopathology

There are so many evidence available which proofs that there is correlation between childhood trauma and inflammation increase the possibility that inflammation could help explain the pathophysiology of trauma-related psychopathology. Some researchers have found there are strong relation between schizophrenia and immune abnormalities. Schizophrenic patients have high level of inflammatory cytokines. Studies also shows that the level of inflammatory cytokines is moderate-to-higher in post-traumatic stress disorder (PTSD). Inflammatory cytokines are also presenting in those individuals, they have face childhood trauma. Inflammation cytokines are also release clinical respond in those patients, who are suffering from depression (Danese Andrea et al., 2017).

Inflammatory links between childhood trauma and psychopathology

- Analogy
- Synergy
- Specificity
- Reversibility (Danese Andrea et al., 2017)

Other Researches on Diseases

The CNS has two parts- Brain and Spinal Cord, while immune system is build up of organs and cells that protect body against infection. Both systems made up small molecules and proteins that can operate as messengers between the two systems. In CNS, these messengers involve hormones and neurotransmitters. Immune system, on another hand, uses proteins called cytokines to communicate with CNS. There are many studies are available, which are given below (Falck Suzanne et al., 2018):

- A 2016 review Source of existing studies found that stressful experiences during childhood can increase the produce of cytokines by immune system. This is correlated with an increased risk of mental illness in adulthood. Researchers accept that this early produce of cytokines may cause changes in the brain that increase a person's risk of developing a mental illness later in life (Falck Suzanne et al., 2018).
- Another 2016 review Source found that sleep disorders also produce of pro-inflammatory cytokines (Falck Suzanne et al., 2018).
- A 2015 article Source noted that rats released different types of cytokines depending on the type of stress they experienced (Falck Suzanne et al., 2018).
- A 2011 review Trusted Source exploring the association between stress and the immune system found that stress may play a role in conditions that affect the immune system, such as cancer, HIV, coronary heart disease and inflammatory bowel disease (Falck Suzanne et al., 2018).

Psoriasis

Psoriasis is a best example of how immune system, CNS, mental health, and stress levels are all interconnected. It's a chronic condition that causes skin cells to grow too quickly. Body removes extra skin cells, but if anybody has psoriasis, these extra cells build up on skin's surface area. This can lead to deep itching and pain (Falck Suzanne et al., 2018).

The developed of skin cells in psoriasis is due to the produce of cytokines from immune system. Psychological stress also may trigger episodes of psoriasis. Indeed, people with psoriasis tend to have increased levels Trusted Source of cortisol, a stress hormone. Hypothalamus, is responsible for cortisol production. When it stimulate by stressors, it signals to pituitary gland, then the pituitary gland produced cortisol. This, in turn, can trigger the produce of pro-inflammatory cytokines by immune system. These cytokines are responsible for an overgrowth of skin cells (Falck Suzanne et al., 2018).

Cancer

Many studies explaining the connection between PNI and Cancer evidence are following:

- Excess of stress was seen to weaken immunity in women, which increased the risk of cancer (Falck Suzanne et. Al., 2018).
- There will be a linkage found that people with breast cancer between depression, the quality of social support they have, and immune cell activity (Falck Suzanne et. Al., 2018).

- People with breast, cervical, or ovarian cancer who found feeling stressed or lonely had abnormalities in their immune systems (Falck Suzanne et al., 2018).
- Connection between the immune system and brain may impact characteristics that are related to cancer treatment, including fatigue, depression, and difficulty sleeping (Falck Suzanne et al., 2018).
- More Stressful condition and depression may be connected with a poorer survival rate for several types of cancer (Falck Suzanne et al., 2018).

Coronary Artery Disease

- In many studies, there are found strong relationship between stress, immune function, and coronary artery disease echoed other studies proof that psychological stress increases the production of pro-inflammatory cytokines (Falck Suzanne et al., 2018).
- This produce in pro-inflammatory cytokines is connected with an increase in heart rate and blood pressure. In addition, the production of cytokines by immune function promotes feelings of sickness or fatigue. According to this study, this reaction isn't immediately harmful. But long-time stress and cytokine production may contribute to the development of cardiac disease (Falck Suzanne et al., 2018).

CONCLUSION

Psychoneuroimmunology has become the latest trend in today's time. Its role is being seen in many types of diseases, whether it is related to ANS or CNS. Many researches have been done on this, and research is being done continuously. The research done on it helps in disease diagnosis and treat them properly. More studies are still needed in this.

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Modification of Dielectric Properties and Dielectric Loss of PZT Ceramics by Substitution of SM ION

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ABSTRACT

The influence of Sm substitution on the Dielectric properties and dielectric loss of $Pb_{1-x}Sm_x(Zr_{0.60}Ti_{0.40})_{1-x/4}O_3$ (PSZT) ($x = 0.00, 0.04, 0.08$ and 0.12) composition prepared from mixed oxide method at high temperature were studied. The dependence of dielectric properties and dielectric loss of polycrystalline ceramic samples $Pb_{1-x}Sm_x(Zr_{0.60}Ti_{0.40})_{1-x/4}O_3$ (where $x = 0.00, 0.04, 0.08$ and 0.12) on frequency and temperature were studied. The value of dielectric constant ϵ_r decreases with the increase in frequency. Also ϵ_r is found to increase first slowly and then rapidly with the increase in temperature to get a certain maximum value (ϵ_r). The value of Dielectric loss of the PSZT compounds strongly depends on its samarium concentration. It exhibits a decreasing trend with the increase in the Samarium content from $x = 0.00$ to 0.08 and then increases when $x = 0.12$, but there are few exception also. Dielectric loss highly depends upon Sm concentration.

Keywords: Dielectric constant, Dielectric Loss, Frequency, Polycrystalline, Ferro electricity.

1. INTRODUCTION

Lead Zirconate Titanate (PZT) ceramics, a well-known ferroelectric ceramic, have come into prominence as the substitute in various piezoelectric applications, due to low cost fabrication and greater durability under adverse atmospheric conditions. PZT is used in a wide range of Piezoelectric, Pyro electric and Ferroelectric device applications [1 -3]. A considerable amount of works have been done on modified PZT ceramics prepared from high-temperature solid-state reaction technique. The properties of PZT are very much sensitive to its compositional fluctuations near the morphotropic phase boundary (MPB), particle size, doping, calcinations and sintering temperature [4 - 5]. It is well established that the electrical and electrochemical properties of the PZT strongly depends on the substitution of rare earth element lanthanum. The polycrystalline pure and lanthanum modified PZT have been extensively used due to their excellent electrical and electromechanical properties [11]. With the compositional fluctuations and other factors, these properties of the materials can be modified according to requirements of a particular device application. Impedance decreases with the increase in temperature. It indicates about the increase in Dielectric constant and ac conductivity and suggests the typical negative temperature coefficient of resistance type behavior of PLZT materials, usually observed in semiconductors [6 -7, 12].

The physical properties and device parameters of PZT – based compounds are greatly influenced by chemical substitutions, synthesis process, and some other factors. The literature survey on pure and modified PZT materials reveals that no systematic studies have been reported on physical properties and device parameters of Sm-substituted PZT (i.e., PSZT) with Zr/Ti ratio 60/40. In view of the above, we have studied the effect of samarium substitution on Dielectric constant and dielectric loss of PZT (Zr/Ti: 60/40) ceramics, which is reported here.

2. THEORY AND EXPERIMENTAL DETAILS

The samples of Sm – modified PZT $Pb_{1-x}Sm_x(Zr_{0.60}Ti_{0.40})_{1-x/4}O_3$ (where $x = 0.00, 0.04, 0.08$, and 0.12) were prepared by a high- temperature solid-state reaction technique. These oxides were mixed thoroughly in a dry condition for 2h in air, and then, in methanol medium for 2h using agate mortar and pestle to get homogeneous mixture of the materials. Now, the well mixed oxides were calcined, first at $950^\circ C$, then at $1000^\circ C$ for 10h. Finally, the formation of desired compounds was confirmed by XRD patterns of calcined powders at $1100^\circ C/10h$. The homogeneous powder of the compounds were pressed into cylindrical pellets of 10 m diameter and 2-3 mm thickness under a uniaxial pressure of $4 \times 10^6 N/m^2$ using hydraulic press [8]. Polyvinyl alcohol was used as a binder to reduce brittleness of the pellets. These pellets were sintered at an optimized temperature of $1200^\circ C$ for about 10h in alumina crucibles in order to get maximum density. The X-ray diffraction data of the calcined powders were recorded using X-ray diffractometer (Rigaku Miniflex, Japan) with $\lambda = 1.5405^\circ A$ in a wide range of Bragg's angles 2θ ($20^\circ \leq 2\theta \leq 80^\circ$) at a scanning rate of $3^\circ/minute$. Using phase sensitive multimeter (PSM; Model 1735) the dielectric data of the materials were obtained in a wide range of frequency (10^2-10^6 Hz) and temperature (room temperature - $500^\circ C$) at a potential difference of 1V.

As we know that for ferroelectric materials, the relative permittivity or dielectric constant increases up to transition temperature (T_C) and above this temperature, it obeys Curie-Weiss law $\epsilon_r = C/(T-T_C)$. A wide variety of methods exist for the measurement of permittivity, depending on the nature of the specimen and frequency range of measurement [9-10]. The dielectric constant (ϵ_r) of all the PSZT ceramic samples with the chemical composition $Pb_{1-x}Sm_x(Zr_{0.60}Ti_{0.40})_{1-x/4}O_3$ [$x = 0.00, 0.04, 0.08 \& 0.12$] were calculated in a wide range of temperature (room temperature to 500°C) and frequencies ($10^3, 10^4, 10^5 \& 10^6\text{Hz}$) from the data obtained by using the experimental systems containing "Phase sensitive multimeter (PSM N4L; Model 1735), laboratory made sample holder and Variac with heating arrangement" at a potential difference of 1V and ac signal level of amplitude 1.5 V.

3. RESULTS AND DISCUSSION

3.1 Temperature –Frequency Dependence of ϵ_r of $Pb_{1-x}Sm_x(Zr_{0.60}Ti_{0.40})_{1-x/4}O_3$

The nature of variation of dielectric constant (ϵ_r) of PSZT ceramics at selected frequencies is shown in Figure 1. From these graphical variations we get that the value of ϵ_r decreases with the increase in frequency. Also ϵ_r is found to increase first slowly and then rapidly with the increase in temperature to get a certain maximum value (ϵ_{max}). If the temperature corresponding to ϵ_{max} is further increased, ϵ_r begins to decrease. It is observed that the temperature corresponding to ϵ_{max} remains nearly insensitive to the change in frequency. The value of ϵ_{max} is also found to be dependent on the Sm^{3+} content through $x = 0.00$ to 0.08 but when $x = 0.12$, ϵ_{max} shows a sharp decrease. The temperature corresponding to ϵ_{max} is found to decrease with the increase in samarium concentration in PSZT.

The temperature corresponding to ϵ_{max} is called Curie temperature (T_C) at which the transition of phase takes place between ferroelectric-Para electric phase. The higher value of ϵ_r is due to space charge polarization in the high temperature region, which comes from mobility of ions and imperfections in the materials. Their combined effect is responsible for sharp rise in ϵ_r .

It has been found that when the temperature of PSZT samples is increased above Transition temperature, dielectric constant begins to decrease obeying Curie-Weiss law.

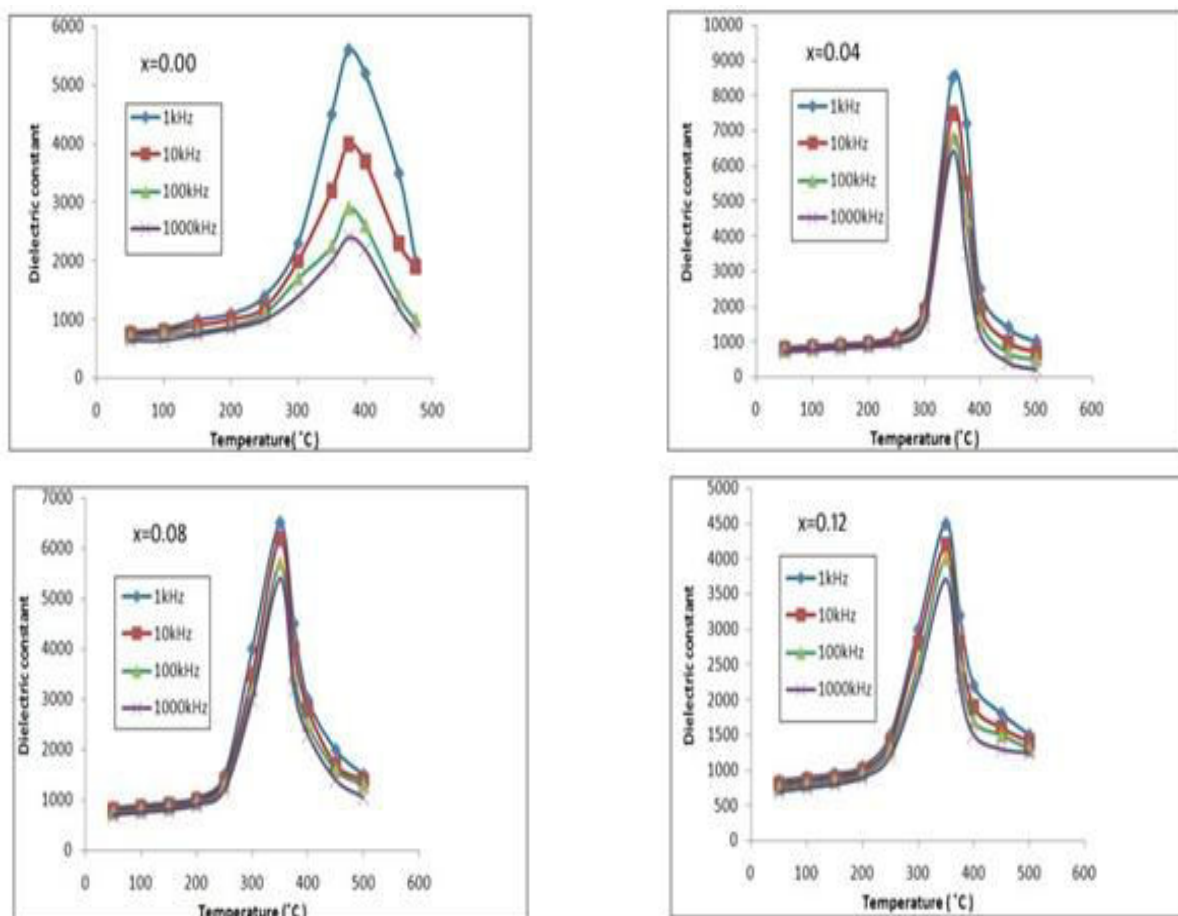


Figure 1: Temperature –frequency dependence of ϵ_r of $Pb_{1-x}Sm_x(Zr_{0.60}Ti_{0.40})_{1-x/4}O_3$

3.2 Results and Discussion of Temperature – Frequency Dependence of Dielectric Loss

The temperature-frequency dependence of dielectric loss ($\tan\delta$) of PSZT ceramic samples (Zr/Ti=60/40; samarium concentration $x = 0.00, 0.04, 0.08,$ and 0.12) is shown in Figure 2. It is observed that the value of $\tan\delta$ is very low and nearly remains unchanged until a certain high Temperature. If the temperature of the materials is further increased above this temperature, $\tan\delta$ exhibits a sharp increase. If the frequency of the PSZT materials is increased, the value of the $\tan\delta$ decreases. Dielectric loss highly depends upon Sm concentration. We observed from the temperature-frequency dependence of the dielectric loss ($\tan\delta$) of all PSZT compounds under consideration that, the value of $\tan\delta$ is very low in most of the cases and almost remains constant until a certain high value of temperature close to the transition temperature (T_c). Above this temperature, $\tan\delta$ exhibits a significant increase. It may be caused due to the space charge polarization. Dielectric loss depends upon frequency. The value of $\tan\delta$ decreases with the increase in frequency.

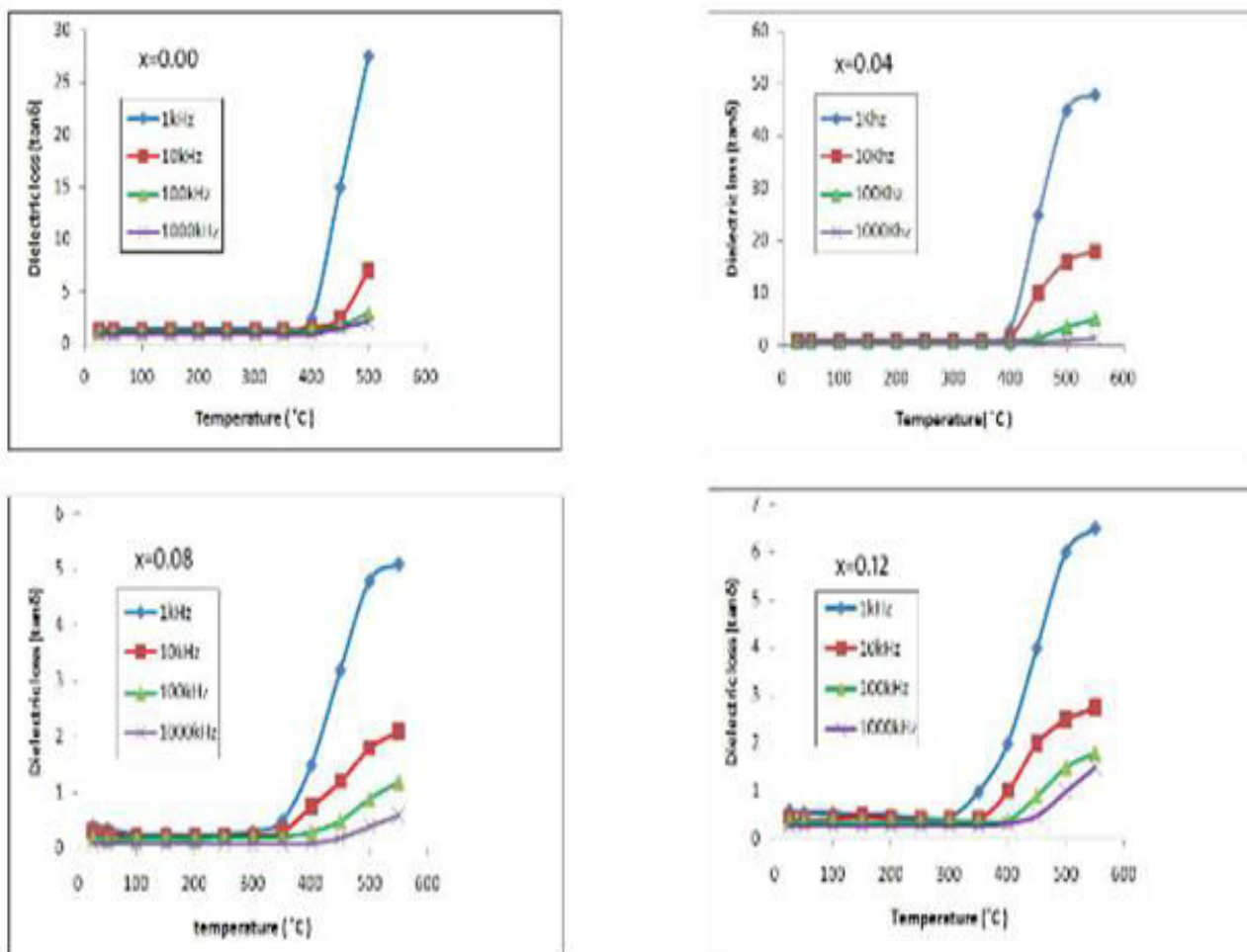


Figure 2: Temperature-frequency dependence of $\tan\delta$ of $\text{Pb}_{1-x}\text{Sm}_x(\text{Zr}_{0.60}\text{Ti}_{0.40})_{1-x/4}\text{O}_3$

4. CONCLUSIONS

We observed from the Temperature – frequency graph of all the PSZT compounds under consideration that, the value of ϵ_r is found to decrease with the increase in frequency. This indicates the normal behavior of the ferroelectric dielectric materials. The higher value of dielectric constant at lower frequencies refers to the simultaneous presence of all the types of polarizations such as space charge, dipolar/orientation, ionic, electronic whose effectiveness gradually decreases with the increase in frequency. It is expected that within low frequency range 10^2 - 10^4 Hz, space charge polarization or interfacial effect remains dominant and results in a large value of dielectric constant which is consistent with the Debye equation. The value of real part of Dielectric constant, ϵ_r decreases with the increase in frequency. Also ϵ_r is found to increase first slowly and then rapidly with the increase in temperature to get a certain maximum value (ϵ_r). If the temperature corresponding to ϵ_{max} is further increased, ϵ_r begins to decrease. The value of Dielectric loss of the PSZT compounds strongly depends on its samarium concentration. It exhibits a decreasing trend with the increase in the Samarium content from $x = 0.00$ to 0.08 and then increases when $x = 0.12$, but there are few exceptions also. Dielectric loss highly depends upon Sm concentration.

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Formulation and Evaluation of Immediate Release Tablet of Antihypertensive Drug

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ABSTRACT

The present investigation attempted to study the effect of disintegrant and processing methods on the physicochemical and in vitro release characteristics of immediate release tablets of Bosentan Monohydrate. To achieve this goal various formulations of Bosentan Monohydrate were prepared by direct compression, wet granulation and fluidized bed granulation methods to achieve maximum drug content with reference to innovator. Varying proportion of disintegrants such as sodium starch glycolate, pregelatinised starch used to compare drug release profile with innovator. Different formulations were prepared and evaluated with respect to various precompression and post compression parameters. The results indicated that the superdisintegrants used have influenced on the disintegration time. The final selection of the formulation F8 ($f_2 = 71$) containing sodium starch glycolate was based on highest f_2 value among all formulations with reference to marketed product.

Keywords: Bosentan Monohydrate, direct compression, wet granulation, disintegrants, drug release.

INTRODUCTION

The oral route remains the perfect route for the administration of therapeutic agents because the low cost of therapy and ease of administration lead to high levels of patient compliance. Oral dosage forms are more popular than other dosage forms because of ease of administration, accurate dosage, self-medication, pain avoidance, patient compliance, etc. Despite of tremendous advancement in drug delivery the oral route of drug administration is the most important method of administration of drug for systemic effect. Oral route is most preferred route by medical practitioners and manufacturer due to highest acceptability by patients. About 60% of all dosage forms available are the oral solid dosage form. The lower bioavailability, long onset time and dysphagia patients turned the manufacturer to the parenteral and liquid orals. But the liquid orals (syrup, suspension, emulsion etc.) have the problem of accurate dosing mainly and parenteral are painful drug delivery, which may cause patient noncompliance. Each pharmaceutical company wants to formulate the novel oral dosage form which has the higher bioavailability, quick action and most patient compliance. [3]. The most popular solid dosage forms are tablet and capsules. Many patients find it difficult to swallow tablets and hard gelatin capsules particularly geriatric and pediatric patients and do not take their medicine as prescribed. Difficulty in swallowing or dysphagia is seen to afflict nearly 35% of general population. In some cases, such as motion sickness, sudden episode of allergic attack or coughing, fear of choking and an unavailability of water the swallowing of tablet and capsule become difficult [4].

MATERIALS AND METHODS

Bonestan was gift sample procured from Concept Laboratories Aurangabad, Maharashtra.

Organoleptic Properties

Colour, taste, odour and melting point was determined.

Preparation of Stock Solution:

Standard stock solution of Bosentan were prepared by dissolving 125mg of Bosentan separately in 100 ml of methanol solution and sonicated for 15 minutes and filtered through whatman filter paper in order to get dilution of 125 μ g/1 ml

Determination of Wavelength Maxima (λ_{max}) Of Bosentan:

The Solution of 10 μ g/ml in pH 7.5 phosphate buffer was prepared. The spectrum was scanned from 200 nm to 400 nm. Wavelength maxima was determined by using Shimadzu U.V. Spectrophotometer

Standard Calibration Curve of Bosentan

From the stock solution, 10 ml was pipetted out and transferred in to a 100 ml volumetric flask and volume was made up to 100 ml with pH 7.5 phosphate buffer contained concentration of 20 μ g/ml. From this solution, aliquots 1, 2, 3, 4, 5, 6ml were pipetted out in to a series of 10 ml volumetric flask and volume was made up to 10 ml with pH 7.5 phosphate buffer so as to make final concentration equivalent to 2-20 μ g. The absorbance of

these solutions was measured against pH 7.5 phosphate buffer as blank at 218 nm using UV-Visible double beam spectrophotometer⁷.

Solubility Study

The solubility of Bosentan is determined by equilibrium solubility method⁸, which employs a saturated solution of Bosentan obtained by adding an excess amount of Bosentan in the solvent to promote drug precipitation, and then stirring for two hours until equilibrium was reached. The mixture was filtered and amount of Bosentan was determined by using UV Spectrophotometer at 218 nm.

Drug Excipient Compatibility Study Using Fourier Transform Infrared Spectroscopy:

The samples were crushed with KBr to make pellets under hydraulic pressure of 10 tones, and then the FTIR spectra were recorded between 400 and 4000 cm^{-1} . It was used to study the interactions between the drug and polymer. The drug and polymer must be compatible with one another to produce a stable product. Drug and polymer interactions were studied by using FTIR^{9,10}.

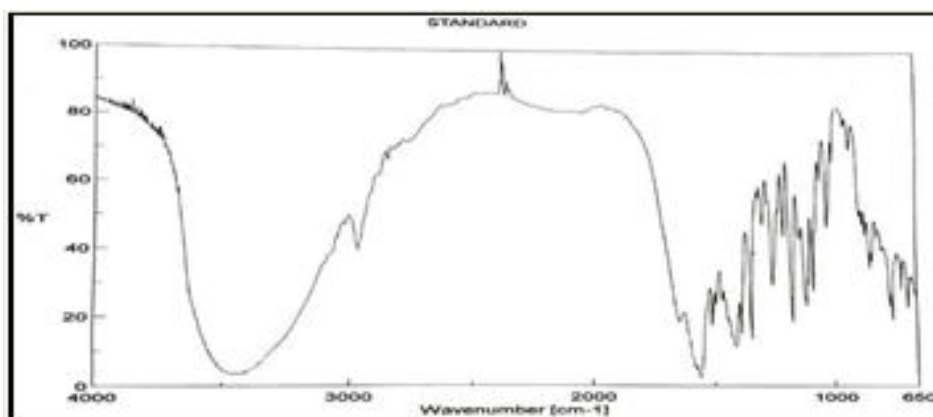


Figure No. 1: FTIR of standard Drug

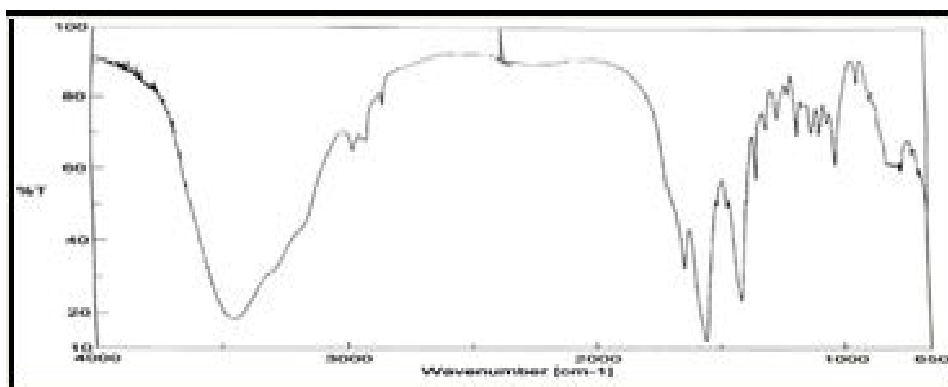


Figure No.2: FTIR of Bosentan with Excipients

Table No. 1: FTIR Interpretation of Bosentan & Excipients

Frequency (cm-1)	Range (cm-1)	Functional groups
3429	3500-3200	O—H
3441	3500-3350	N-H Stretch
2958	3000-2850	C-H
1585	1650-1580	N-H Bend
1343	1370-1335	S=O

Evaluation of Powder Parameters

Bulk density, tapped density, Carr's index, Hausner ratio and angle of repose of powder were evaluated.

Table No. 2: Precompression Evaluation Of The Powder Blend

Formulations	Bulk Density (g/ml)	Tapped Density (g/ml)	%Compressibility	Hausner's ratio	Angle of Repose (θ)
F1(A)	0.321 \pm 0.12	0.354 \pm 0.14	15.38 \pm 0.17	1.08 \pm 0.21	25 ⁰ 65' \pm 0.21
F1(B)	0.318 \pm 0.23	0.352 \pm 0.23	14.29 \pm 0.28	1.10 \pm 0.32	25 ⁰ 73' \pm 0.08

F1(C)	0.315±0.15	0.342±0.27	15.69±0.33	1.12±0.53	25 ⁰ 16'±0.12
F2(A)	0.323±0.36	0.354±0.19	14.58±0.42	1.14±0.62	26 ⁰ 68'±0.21
F2(B)	0.321±0.27	0.358±0.27	15.38±0.27	1.17±0.37	26 ⁰ 89'±0.32
F2(C)	0.314±0.34	0.338±0.37	14.00±0.34	1.14±0.45	27 ⁰ 58'±0.33
F2(D)	0.312±0.12	0.335±0.26	14.19±0.64	1.17±0.56	28 ⁰ 38'±0.15
F2(E)	0.315±0.18	0.332±0.16	15.09±0.29	1.15±0.62	26 ⁰ 42'±0.02

Preparation of Immediate Release Tablets:

Tablets containing Bosentan were prepared by direct compression technique (Table No.3) using pregelatinized starch as polymers, PVP-K-30 as binder. All ingredients were sifted through sieve no. 18. All the ingredients except magnesium stearate and talc were blended in glass mortar uniformly. After sufficient mixing of drug as well as other components, magnesium stearate as a lubricating agent and talc as a glidant were added and further mixed for additional 2-3 minutes. Final powder blends were compressed.

Table No. 3: Formulation of immediate release tablets

Ingredients	F1 A	F2 B	F3 C	F4 A	F5 B	F6 C	F7 D	F8 E
Bosentan	129	129	129	129	129	129	129	129
Pregelatinized Starch	53	53	53	53	53	53	53	53
Starch	62	62	62	692	62	62	62	62
PVP-K-30	21	21	21	21	21	21	21	21
Sodium Lauryl Sulphate	20	20	20	20	20	20	20	20
Sodium Starch Glycolate	20	20	20	-	-	-	-	-
Glycerol Behenate	-	-	-	20	20	20	20	20
Starch	2	2	2	2	2	2	2	2
Mg.Stearate	300	300	300	300	300	300	300	300
Talc	2	2	2	2	2	2	2	2

Evaluation of Post Compression Parameter of Immediate Release Tablets:

Colour

The tablets were observed for color.

Shape & Thickness

Shape & Thickness of tablet was measured using Vanier Calipers.

Hardness

The Monsanto hardness tester was used.

Friability

Tablets were tested for friability using Roche Friabilator.

Weight Variation

Weighed 20 tablets individually, calculated the average weight, and compared the individual tablet weights to the average.

Table No. 4: Standard Physical Tests For The Tablets

Formula- tions code	Hardness (kg/cm ²)	Thickness (mm)	Weight Variation(mg)	Friability(%)	Drug content(%)	Disintegration Time (min)
F1(A)	4.90±0.40	4.3±0.2	347±7.5	1.14±0.08	97.12±0.12	9'21 Min
F1(B)	5.10±0.31	4.2±0.2	348±7.5	1.18±0.12	97.51±0.11	8'47 Min
F1(C)	5.60±0.40	4.5±0.2	346±7.5	1.21±0.31	98.65±0.13	9'21 Min
F2(A)	7.90±0.15	4.3±0.2	349±7.5	0.48±0.22	100 ±0.23	10'18 Min
F2(B)	7.10±0.27	4.4±0.2	350±7.5	0.54±0.16	98.35±0.22	9'17 Min
F2(C)	7.20±0.30	4.5±0.2	348±7.5	0.58±0.35	99.04±0.11	8'37 Min
F2(D)	7.10±0.57	4.3±0.2	351±7.5	0.64±0.41	98.32±0.13	8'11 Min
F2(E)	7.20±0.60	4.1±0.2	342±7.5	0.37±0.37	98.45±0.14	9'51 Min

All the values are representing as Mean ± S. D. (n=8) CF

Drug Content

Randomly 10 tablets were taken, crushed and amount equivalent to 5 mg of drug was taken and dissolved in solvent mixture, sonicated, make up volume with solvent mixture, further dilution 5ml of stock solution taken in 50ml of volumetric flask and make up volume with solvent mixture filter the solution and record the absorbance using spectrophotometer at 218nm. Then drug concentration was measured using standard graph. The measurements were carried out in replicates (n=6).

In-Vitro Dissolution Study

All the formulations prepared were subjected to *in-vitro* release study. In vitro drug release profiles of all the formulations of Bosentan prepared by wet granulation method was performed by modified dissolution apparatus. The temperature was maintained at 37± 0.50°C. The % cumulative drug release graphs shown in figure (12- 13) In all these formulations F1 to F8 showed the drug release of 99.24 % within 45 min. it means that maximum drug release was observed using this formulation, so it is said to be optimized formulation of series which is prepared by wet granulation method. From the results.

Tablet hardness was determined by using Monsanto hardness tester. Hardness values of the formulation batch no.1 to batch no 3 the hardness value will decrease that is most be less than 6.30 kg/cm² and batch no 4 to batch no 8 will ranged from 6.50-7.30 kg/cm², which indicate good strength of tablet.

Table No.5: In-Vitro Drug Release Study

Time	F1 (A)	F1 (B)	F1 (C)	F2 (A)
0	0	0	0	0
10	83.18	72.08	84.81	68.85
15	89.82	78.47	87.26	76.28
25	92.34	83.25	91.83	87.43
35	95.46	89.14	94.32	91.01
45	96.47	95.87	96.03	99.24

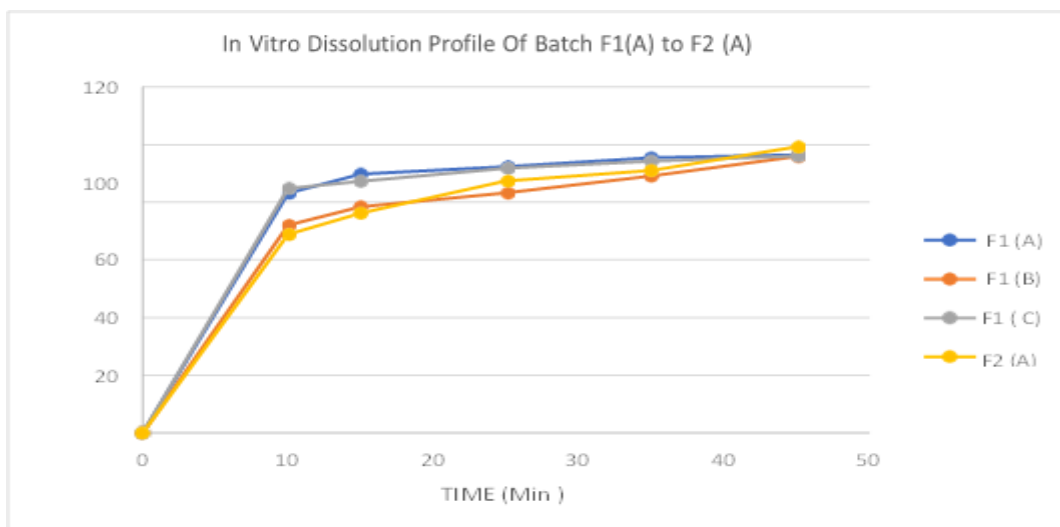


Fig No.3: In Vitro Drug Release Study of Batch F1 (A) to F2 (A)

Table No. 6: In Vitro Drug Release Study Of Batch F2(B) To F2(E)

Time	F2 (B)	F2 (C)	F2 (D)	F2 (E)
0	0	0	0	0
10	86.32	78.46	82.43	80.26
15	90.21	83.24	86.56	85.32
25	94.85	89.24	92.73	90.45
35	97.03	93.74	95.34	92.63
45	98.97	95.58	96.07	93.04

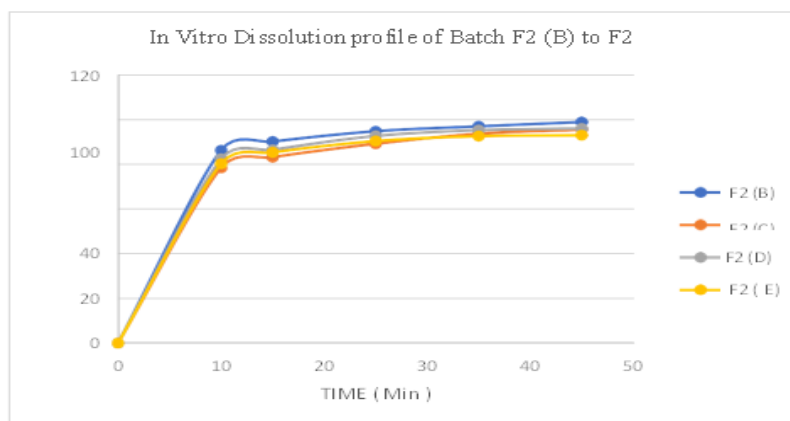


Fig No. 4: In Vitro Dissolution profile of Batch F2 (B) TO F2(E)

Stability Studies

Stability is defined as the ability of a particular drug or dosage form in a specific container to remain within its physical, chemical, therapeutic, and toxicological specifications. Drug decomposition or degradation occurs during storage, because of chemical alteration of the active ingredients or due to product instability, lowering the concentration of the drug in the dosage form. Stability study of the dosage form must include a section for product characterization and another section to study the product stability during storage. Formulations are evaluated for their appearance, possible weight gain in drug content thickness, flatness, folding endurance, tensile strength, moisture content and moisture uptake, and *in-vitro* release study by keeping dosage form in different temperature and humidity condition after specified time. The stability study indicates that the formulation is quite stable at different conditions of storage.

RESULTS AND DISCUSSION

- ❖ For the treatment of pulmonary hypertension Bosentan conventional tablets are formulated. The drugs are found to be stable. Also confirmed that there is no interaction between the drug and the excipients as a result of incompatibility results in different ratios and by FTIR study. The resulted tablets are evaluated for their hardness, weight variation, thickness, friability, disintegration, dissolution etc.
- ❖ In vitro drug release profiles of all the formulations of Bosentan prepared by wet granulation method was performed by modified dissolution apparatus.
- ❖ In vitro drug release study showed that batch F2 (A) showed good release due to higher percentage of super-disintegrant.
- ❖ In the F1(A) trial batch the hardness and the friability will be more and the result also the low.
- ❖ When the starch added in F2 (A) batch then there is increase in the hardness and friability.
- ❖ Then the Starch added in F2 (A) to replace the Glycerol Behenate then result is clear
- ❖ White colour tablet and progress in the hardness of tablet it means batch F2 (A) gives the good results and it is optimized batch.
- ❖ In all the formulations F2 (A) showed the drug release of 99.24% within 45 min. it means that maximum drug release was observed using this formulation, So it is said to be optimized formulation of series is F2 (A) which is prepared by wet granulation method.

CONCLUSION

A new dosage format, the immediate release pharmaceutical form has been developed which offers the combined advantages of ease of dosing and convenience of dosing. These tablets are designed to release the medicaments with an enhanced rate. Due to the constraints of the current technologies as highlighted above, there is an unmet need for improved manufacturing processes for immediate release pharmaceutical form that are mechanically strong, allowing ease of handling and packaging and with production costs similar to that of conventional tablet.

The stable robust qualities of Bosentan conventional tablets are formulated. The formulated tablets are compared with the specifications of the innovator and the optimized formulation complies with the specifications. The Super disintegrant used in the formulation is sodium starch glycolate which is different from that of the innovator and even the binder differs from the innovator even though the specifications of the evaluation are compiled as per the specifications. The optimized formulation F2 (A) is kept for stability studies and the results are good and acceptable I.P. limits.

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The Stereo Selective Preparation of B-Hydroxy Esters Employing Enzymatic Reduction in an Ionicliquid Solvent

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ABSTRACT

The use of microorganisms in the biotransformation processes is gaining importance in preparative organic chemistry. The chiral β -Keto esters are used in the synthesis of vital target molecules which are usually prepared by the reductions of β -diketones. The benefit of using microorganism, include low cost, environmentally safe procedures compared to conventional chemical processes. The enzymes secreted by microorganisms are able to perform reactions under Mild conditions. Their kinetic study w.r.t. pH and temperature gives remarkable chemo-, regio-, and stereo selectivity. The various parameters like pH, time, solvents/ionic liquids are optimized for the biotransformation to achieve maximum chemical yield. These biotransformations are also useful to introduce the chiral center in the compounds. The use of whole cells reduces the cost of isolation and purification enzymes, as well as the systems are economical and operationally simple without any unwanted bi-products.

Keywords: Biotransformations, Stereo selectivity, Stereo specificity, β -hydroxyl esters, Chiral center. Etc.

INTRODUCTION

Biotransformations plays an important role in preparation of enantiomerically pure molecules. Enzymes are very much useful for highly selective transformations under mild reaction conditions with minute concentration of the by-product. Enzymes used in biotransformations are eco-friendly as they undergo complete degradation by environment itself. Enzymes act in pH range of about 5 to 8 and around 7 shows high activity. Enzymes also shows better activity in 20-40°C preferably at around 30°C. These conditions minimizes traditional methodology problems like Side reactions, decompositions, isomerization and rearrangements.

This introduction is comprehensive and relates with the important features and developing trends in the field of biotransformation. About 50 % 1998's literature in the foresaid area involves the work of hydrolysis (27%) or esterification reactions (25%) by the commercially available enzymes, mainly lipases. A broad range of aliphatic and aromatic ketones are stereo selectively reduced using dehydrogenase to form the chiral alcohols.[1-4].

During the reaction enzyme deliver Hydride either from the si- or re-side of ketone to produce (R) or (S) alcohols respectively. The stereochemistry of the product may be predicted by the simple model referred as Prelog's rule. [5]. Baker's yeast (*Saccharomyces Cerevisiae*) is the most widely used micro-organism for asymmetric reduction of ketones [6-10]. In the last two decades industrial chemistry involves such oxidation and reduction processes by the use of oxidoreductase enzyme.[11].

The field of biotransformation is one of the most powerful technique for the preparation of optically active compounds by using asymmetric catalysts. Now availability of wide variety of enzymes [12] makes this field important and the awareness that the reactions are not difficult to scale up, if needed[13].The enantiomeric pure products having a great importance in pharmaceutical industries. The biological activity of drug is depends upon the chirality[14]. The pharmaceuticals had to be tested both the enantiomer for their activity and toxicity before they are marketed. The active enantiomer is called as eutomer and less active enantiomer will be distomer. The whole cell biocatalysts are to be used for synthesis of such small active drug molecules[15].

EXPERIMENTAL

METHODOLOGY

Whole cells usually have a multitude of enzymatic activities, that why the limitations of this methodology is selectivity. In order to enhance more selectivity in the system microorganism mediated reduction are to be used. It will have great importance to control the reaction parameters. The Optically active 4-halo-3-hydroxybutiric acid esters are the very much important intermediates for synthesis of enormous medicinal compounds[16].

Biotransformation has a large number of advantages when compared to the corresponding chemical methods. Biocatalysts are known to have some interesting and advantageous features i.e. high efficiency, mild environmental friendly operation conditions, versatility and last but not least have high selectivity (chemo, regio, and stereoselectivity). The selectivity and particularly the stereochemical preference are observed when biocatalyst act on their substrates[17].

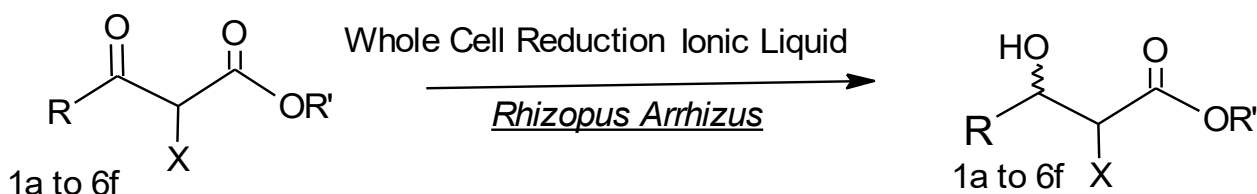
A) Incubation Condition

The microorganisms are inoculated in an autoclave (15 psi for 20 min.) the nutrient broth (100 ml contains glucose 5g.+peptone 2g.+soyabean meal 0.4 gm.) in 250 ml conical Flask at 30°C. The flasks were shaken on rotary shaker operating at 220 r.p.m.

B) Experimental Method

All Chemicals used were of synthetic grade purchased from S.D. Fine Chemicals And Sigma-Aldrich. The wet mycelium about 5 gm. Was taken in 50 ml phosphate buffer, (0.1 M pH6.4/7.0/7.4) buffer (pH 7, 0.01 M) potassium dihydrogen phosphate, calcium phosphate (monobasic), magnesium sulfate and ammonium tartrate (diammonium salt) (10:1:1:50) and the substrate (1 gm in 5ml 95% ethanol/Ionic liquid) were added and shaken for different time intervals to get maximum optical and chemical yields. The progress of the reaction studied by TLC. After Completion of reaction filtrate solution was saturated with NaCl and extracted with 5 * 20 mL portions of diethyl ether. The combined organic layers were dried (MgSO₄) and the solvent evaporated under reduced pressure to leave a residue of the crude product.

C) Scheme



Scheme 1.1

C) RESULTS AND DISCUSSION

The substrate approach the enzyme catalyst by its *Re*- face therefore it resulted in alcohols of *S*-configuration. when there is the bulky groups at α position it leads to *R*-configuration. The Spectral data, together with the absence of ketone C=O stretching vibration bands and the presence of O–H stretching vibrations in the IR spectra, suggested

the presence of a hydroxyl functional group in the molecules.

Confirmation of Product by Chemical Test-

Test	Observation	Inference
Test For Ketone Substance+Sodium Nitroprusside +NaOH Solution	No Red Colour	Ketone Group Absent
Test for Alcohol 1ml of given compound in a dry test tube. Add a few drops of ceric ammonium nitrate reagent and shake the solution well	Red ppt	Alcohol group present
Test for Ester- Substance+Water+Phenolphthalein+Dil NaOH, Heat On Water on Water Bath	Pink Colour Slowly disappears	Ester Functional Group is present

1 A Confirmation of Ethyl (3*r*)-3-Hydroxy Hexanoate-

FT-IR Data 3450 (O-H str) 2870 (C-H str) 1735 (C=O str) 1470 (C-H def) 1140 (CO str)

¹H-NMR Data 4.11(CH₂) 3.84(CH) 2.40(CH₂)2.0(OH) 1.42(CH₂) 1.33(CH₂) 1.30(CH₃) 0.97(CH₃).

2 B- Confirmation of Ethyl-2-Chloro (3*r*)-3-Hydroxy Butanoate

FT-IR Data 3450 (OH STR) 2982 (CH STR) 1744 (C=O STR) 1352 (C-H def) 1180 (CO str)

¹H-NMR Data 4.37(CH) 4.34(CH) 4.12(CH₂) 2.0(OH) 1.31(CH₃) 1.21(CH₃)

3 C- Confirmation of Ethyl-2-Methyl (3*r*)-3-Hydroxy Butanoate

FT-IR Data 3450 (OH STR) 3060 (C-H STR) 1763 (C=O str) 1470 (C-H def) 1144 (CO str)

¹H-NMR Data 4.12(CH₂) 4.02(CH) 2.57(CH) 2.0(OH) 1.30(CH₃) 1.24(CH₃) 1.21(CH₃)

4 D- Confirmation of (S)-(+)-Ethyl 3-Hydroxybutanoate

FT-IR Data cm^{-1} : 3440, 2980, 1732, 1375, 1300, 1180, 1035

$^1\text{H-NMR}$ Data (CCl_4) δ : 1.15 (d, 3 H, $J = 6.5$, CH_3), 1.30 (t, 3 H, $J = 7$ Hz, CH_3), 2.35 (d, 2 H, $J = 6.5$, CH_2CO), 3.16 (s, 1 H, OH), 4.05 (q, 2 H, $J = 7$, CH_2O), 4.15 (m, 1 H, CHOH).

6 F- Confirmation of Ethyl (3s)-3-Hydroxybutanoate (C₆H₁₁O₃)

FT IR cm^{-1} : 3245-3401 Broad Peak (OH), 1710 (C=O), 1191 (C-O)

$^1\text{H-NMR}$ (δ ppm) 500 MHz (CDCl_3): 1.18 (3H, d, $J = 6.34$ Hz, CH_3CHOH), 1.21 (3H, t, $J = 7.2$ Hz, CH_3CH_2), 2.4 (2H, q, $J = 4.1, 8.4$ Hz, CH_2CO), 3.3 (1H, s, OH), 4.2 (3H, m, CHOH and OCH_2CH_3) ppm.

Result Table:-

Sr. No	R	X	R'	Time In (hrs)	Yield (%)	Ee %	$[\alpha]_D^{25}$ (Ether/ CHCl_3)	B.P. Obs. [Lit.]
1a	-Pr	-H	-Et	45	84	92.6	-25	98 [98]
2b	-Me	-Cl	-Et	42	90	93.5	+37.5	156 [155]
3c	-Me	-Me	-Et	46	96	94.5	+37	172 [170]
4d	-Et	-H	-Et	52	67	40	-	199 [200]
5e	-Me	-H	-Me	55	70	42	-	170 [170]
6f	-Me	-H	-Et	70	95	90	+37.2	181 [182]

Table 1.1

CONCLUSION

It has been concluded that present work provide the very good experimental procedure for the reduction of various 3 ketoesters as compared to the reduction by yeast cells. These reactions are much useful for inducing the chirality in the molecule as well as the reaction time required will be decreases with increase in yield. These Intermediates having enormous pharmaceutical uses in synthesis of drugs. Chiral hydroxy esters and alcohols are useful intermediates and auxiliaries in the production of various fine useful chemicals.

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An Analysis of the Representation of Female Tradition in Elaine Showalter's "Towards a Feminist Poetics"

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ABSTRACT

Feminism is understood as the belief in social, economic, and political equality of the sexes and according to Toril Moi Feminism is defined as "a political position against patriarchy" and feminist criticism as "a specific kind of political discourse: a critical and theoretical practice committed to the struggle against patriarchy and sexism". It is a wide phenomenon and holds plenty of space for research and discussion. The feminist movement involves sociological and political theories concerning issues in gender difference and the thoughts on feminism are getting stronger with the development of the century. In fact writing is an entirely different world for women to state her views and also to bring an end to all cruelty and abuse against women. The essence of this paper deals with the most celebrated work of Elaine Showalter's "Towards a Feminist Poetics" which sheds light on the female culture which has turned its hands to unshackle itself from the male descent of Literary History. The paper comprises the works recently published by the women writers of digital era and their representation of female tradition in different aspects with regard to the term "Gynocritics." In addition, it attempts to merge the efforts of various women writers from different realms of literature and centralizes the distinct waves of feminism to the era of tech-savvy environment.

Keywords: Gynocritics, Female tradition, Feminism, Representation, Culture.

INTRODUCTION

Though largely originating in the West, feminism is expressed worldwide and is signified by various organizations committed to activity on behalf of women's rights and interests. Throughout most of Western history, women were restrained to the domestic sphere, while public life was reserved for men. In medieval Europe, women were denied the right to study, own property or to participate in public life. There were instances of where women had to cover their heads in public at the end of the 19th century in France, and, in many parts of Germany, a husband could sell his wife as he had the rights to do it. Even as late as the early 20th century, women were neither given the priority to vote nor hold elective office in Europe and the US. Without a male representative women were prevented from conducting business and married women had no rights to control their own children without the permission of their husbands. On the whole, women were deprived of education and were not given a post in most of the professions. Such restrictions even continue today in most parts of the world.

Elaine Showalter an American literary critic, feminist and writer on cultural and social issues is one of the founders of feminist literary criticism in United States academics, developing the concept and practice of Gynocritics. She is well known and respected in both the academic and the popular cultural fields and has written and edited numerous books and articles focusing on a variety of subjects from, feminist literary criticism to fashion, sometimes sparking widespread controversy, especially with her work on illnesses. Showalter is a specialist in Victorian literature. Her most innovative work in these fields is in madness and hysteria in literature, specifically in women's writing and in the portrayal of female characters. It is notable that Feminist criticism emerged as an offshoot of women's Liberation Movement. This paper further draws attention on female writers who have walked through challenging times and proved to be successful in all spheres. It deals with the advent of three stages respectively: internalized male assumptions, a demand for autonomy and self-discovery.

In Showalter's best-known works *Towards a Feminist Poetics*, she talks about female malady: women, madness and English culture, sexual anarchy, gender at culture and modern media. In 2007, Showalter was the chair of the judges for the prestigious British literary award, the Man Booker International prize.

Showalter's book *Inventing Herself*, (2001), a survey a feminist icon, seems to be the culmination of a long-time interest in communicating the importance of understanding feminist history of the feminist tradition within the wilderness of literary theory and criticism. Working in the field of feminist theory and criticism which was just emerging seriously conveys the importance of mapping her discipline's past in order to both ground it in substantive theory, and a mass a knowledge base that will be able to inform a path for future feminist academic pursuit. Showalter is concerned by stereotypes of feminism that see feminist critics as being obsessed with the

phallus and obsessed with destroying male artists. She wonders if such stereotypes emerge from the fact that feminism lacks a fully articulated theory.

Another problem for Showalter is the way in which feminists turn away from theory as a result of the attitudes of some male academics who consider theory is their property. Showalter writes: from this perspective, that the academic demand for theory can only be heard as a threat to the feminist need for authenticity, and the visitor looking for a formula that he or she can take away without personal encounter is not welcome'. In response, Showalter wants to outline a poetics of feminist criticism.

In *Towards a Feminist Poetics*, Showalter divides feminist criticism into two sections.

The Woman as a Reader or Feminist Critique

The way in which a female reader changes the anxiety of a given text awakening it to the significations of its sexual codes,' historically grounded inquiry which probes the ideological assumptions of literary phenomena' subjects include the images and stereotypes of women in literature, the omissions of and misconceptions about women in criticism, and the fissures in the male-constructed literary history,' concerned with the exploitation and manipulation of the female audience, especially in popular culture and film, and with the analysis of woman-as-sign in semiotic systems,' 'political and polemical; 'like the old testament looking for the errors of the past.

One of the problems of the feminist critique is that it is male-oriented. If we study stereotypes of women, the sexism of male critics, and the limited roles women play in literary history, we will not be learning what women have felt and experienced, but only what men thought women should be. The critique also has a tendency to naturalize women's victimization by making it the inevitable and the most obsessive topic of discussion.

The Woman as Writer or Gynocritic

Showalter has coined the term 'gynocritics to describe the literary criticism based on a feminine perspective. Probably, the best description Showalter gives of gynocritics is in *Towards a Feminist Poetics*. In contrast to [an] angry or loving fixation on male literature, the program of gynocritics is to construct a female framework for the analysis of women's literature, to develop new models based on the study of female experience, rather than to adapt male models and theories. Gynocritics begins at the point when we free ourselves from the linear absolutes of male literary history, stop trying to fit women between the lines of the male tradition, and focus instead on the newly visible world of female culture.

This does not mean that the goal of gynocritics is to erase the differences between male and female writing. The term gynocritics is not "on a pilgrimage to the promised land in which gender would lose its power, in which all texts would be sexless and equal, like angels" (Wiki), rather, gynocritics aim to understand the specificity of women's writing not as a product of sexism but as a fundamental aspect of female reality. Its prime concern is to see 'woman as producer of textual meaning, with the history themes, genres, and structures of literature by women'. Its 'subjects include the psychodynamics of female creativity. It studies linguistics and the problem of a female language in literary text. It reviews the trajectory of the individual or collective female literary career and proposes 'to construct a female framework for the analysis of women's literature, to develop new models based on women's experience '. Its study focuses on the newly visible world of female culture'; 'hypotheses of a female sub-culture'; 'the occupations, interactions and the consciousness of women 'and projects how feminine values penetrate and undermine the masculine systems that contain them', and at its extreme, it is 'engaged in the myth of the amazons, and the fantasies of a separate female society'.

Showalter acknowledges the difficulty of defining the unique difference of women writing which she says is a slippery and a demanding task in feminist criticism in the wilderness. Also she says that gynocritics may never succeed in understanding the special differences of women's writing, or realize a distinct female literary tradition. But with grounding in theory and historical research, Showalter sees gynocriticism as a way to learn something solid, enduring, and real about the relation of women to literary culture.

Showalter then provides an exemplary feminist critique of Thomas Hardy's "The Mayor of Casterbridge" to demonstrate that one of the problems of the feminist critique is that it is male oriented, meaning that in some sense every feminist technique even when criticizing patriarchy is focused toward the female. As an alternative, Showalter presents gynocritics as a way to construct a female framework for the analysis of women's literature, to develop new models based on the study of female experience rather than to adapt to male models and theories,"

To begin to trace out this radically female centered theory, Showalter notes the excerpts from feminist historians and sociologists. She then moves on to an engaging discussion of the experiences of Elizabeth Barrett Browning

and other female authors to show the need for completeness in discussing women authors ways in which it is necessary to leave oneself a space to deal with other things besides work, so much has that work been influenced by conditions that have nothing to do with art. Elaine Showalter's three phases of feminism: the "feminine" (women writers imitate men), the "feminist" (women advocated minority rights and protests), and the "female" (the focus is now on women's texts as opposed to merely uncovering misogyny in men's texts).

Me Too and Its Significance

Me Too movement and the social media have provided a perfect medium, breaking the barricades by exploding cultural reckoning that impelled the increased self-reflections, conversations, and changed insights of sexism, sexual harassment and sexual assault. Victims live in a dilemma when victims' allegations of abuse are considered as false, and they are not abused only by the abuser but also by the so-called modern society that neither has believed nor protected them. In this Scenario, the mental conundrum of many deprived survivors can be understood who might not feel empowered to break their silence. It seems entirely plausible in the vulnerable groups like survivors who work in low-wage positions, persons with mental illness, or children.

On the other hand, when assertions that have no basis are believed, innocent adults can have devastating experiences with shame and isolation. Every divulgence of sexual abuse must be taken seriously and investigated in detail. There must also be an equal punishment to someone who makes false charges. Both victims and offenders have been found to have a higher risk of having or developing mental illness. The system should endorse mental health support to both the victim and the offender to prevent further damage. These movements have definitely made a strong push for introducing actions to create safer work environment for future generations.

CONCLUSION

The true meaning of feminism lies in the perspective of an individual. The real caption of feminism is entirely different from the male constructive meaning of the term. Feminism is different kinds of movements and it attempts to pin up and ensure equality of the sexes. It assimilates the view that women are treated in an unfair way by prioritizing the male patriarchy.

Feminism is not a caged sky rather it should yield the women to provide wings to venture out the world. Social media plays a huge role in making these kinds of movements popular. So many people from different arenas come out of their caged sky and have voiced out their opinions against sexual harassments and assaults. Particularly, ME TOO movement has begun to extend virally as an hash tag on social media. The main motto of "Me Too" is to empower young women in all the realms of life. But later on, the objective has changed and it has got expanded to the widest sense. Large masses of people have come out and raised their voices against sexual assaults.

By combining the different efforts of women, ME TOO movement has extended its hands at various levels and attained its needed reception and recognition. It is evident that the motto of three waves of feminism is entirely different from the fourth wave of feminism. Elaine Showalter has mentioned three phases in her work, "Towards a Feminist Poetics" and ventured out the revolutionary ideas. The way which Elaine Showalter elucidated the three phases has been appreciated and will be remembered by the literary world ever. The third phase has concentrated on the self-discovery and the autonomy of women. As a sequel, ME TOO has revolutionized the world and it has shaken the world with its different protests and its proposed policies.

As an outcome, this paper concludes that feminism is not about movements, shout outs, protests, hash tags and popularizing taglines related to women. It is all about the way which the society perceives and respects the needs of the fellow human beings and how gender equality touches new horizons which will help the global society in myriad ways with positive changes.

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Crypto-Currency- Legality and Restriction in India

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ABSTRACT

This paper encapsulates the scope of crypto currency trade, usage and its legal status in India. Latest decisions taken so far regarding the governance of crypto-currency evaluates the turbulent time ahead for the nation's nascent, however digital industry is on boom. During 2018, India completely banned trade of all crypto currencies, strictly prohibiting the banks to not provide service to customers in respect to exchanging digital currencies.^[1] Although the nations Supreme Court overturned the ban by 2020, the government, led by the Reserve Bank of India (RBI), continued to make no secret of its discomfort with the trade of crypto in India. This paper examines the regulatory drive of crypto-currency in India from its ban to its regulation to date. Since from complete ban on crypto-currencies during the year 2016 to an forthcoming bill for its regulation, the government's mindset on digital assets has changed significantly over the precedent few years. The approaching Crypto-currency and Regulation of Official Digital Currency Bill, 2021 seems to be entirely is different year from the previous ones comparing with 'Banning of Crypto-currency and Regulation of Official Digital Currency Bill, 2019.' Where the older regulations was introducing and imposing a complete ban on all crypto-related activities which involves mining, buying, selling, holding and dealing, the later one is consider to make a clear peculiarity in terms of its often use of purposefulness as a currency.^{[2][1]}

Keywords: Crypto-currency, legal status, trade, regulations and governing

I. PREVIOUS SEARCH AND HISTORY

There is a lot work that is to be done when it comes to the legal aspect of this trade. Though article had been published demonstrating ups and downs in context to both supporting and criticizing the venture in India however, the consolidated information on the topic and its future is the motivation and hence this paper. The rapid developments and advancements in the area of technology in India, especially during the challenges posed amid spread of COVID-19, the fintech sector has shown tremendously promising outcomes. There has been exceptional growth, propelled largely by inquisitiveness and popularity, among the India population towards usage and trade of crypto currency such as Bitcoin, Binance, Ripple, Dogecoin, many other Alt-coins, which ultimately lead large number of people to started investing a perceptible part of their time and money in these virtual currencies ventures.^[2]

In India, the supreme financial authority and governing body, the Reserve Bank of India ("RBI"), recognized virtual currency, more specifically and securely defined form of digital currency created as a result of a series of written computer instructions using cryptography /encryption and is thus free of central issuing authority per se in case if any. Crypto-currency backed through block chain technology, which establishes a person-to-person issuance system that utilizes private and public keys allowing encryption and authentication for secure and highly safe transactions.^[3]

The Reserve Bank of India (RBI) issued a circular warning the public against the use of virtual currencies in the year 2013. The bank also warned users, investors, and traders of crypto currencies about the potential risks involved in, operational, financial, legal, customer protection, and security-related concerns they are divulging themselves to.

II. OBJECTIVES OF THE STUDY

1. To study journey of the crypto currency in terms of its legal status in India
2. To study future aspects related in context to legality of crypto currencies in India

III. Legal Status Journey So Far And Present Scenario

The growing popularity of crypto currency and being an unattended and unregulated market holding huge potential of over a trillion dollars, India also witnessed a exponential surge of crypto-currency trade in crypto exchange. Advocating the increasing reputation of the use and trade of crypto-currency within such a short span of a year and the potential revenue loss to the Government of India; the regulators and governing authorities started to take notice and as a consequence, in 2013 the Reserve Bank of India (RBI) issued a press release, warns the public against dealing and trading in virtual currencies.^[4]

At the same moment, couple of Public Interest Litigations (PILs) was also filed in the Supreme Court of India, one demanding for a ban on buying and selling of crypto-currencies in India, the other asking them to be regulated. Finally, in November, the government formed a committee to take up the matter around virtual currencies and propose actions. Till the time, there was no ban on crypto-currencies and most banks permitting transactions from crypto-currency exchanges.

(a) Constraints on Crypto in India After 2013

Banks in India continued to allow transactions on crypto-currency exchanges — on February 1, 2017, RBI released another circular concerning these ventures and reiterating financial consequences associated with virtual coins. By the end of 2017, a warning was issued by RBI and the finance ministry clarifying that virtual currencies are not a legal tender in India.

In the month November 2017, India government, formed and established a high-level Inter-Ministerial Committee to report on various issues / concerns related to the use and trade of virtual currency and subsequently, in July 2019, this Committee presented its final report recommending a blanket ban on private crypto-currencies as of that moment.

It very obvious the threat of revenue loss was a topic of greater concern to RBI, that it is pertinent to note that even prior to the submission of report from the Inter-Ministerial Committee, in April 2018, RBI had issued a circular imposing restrictions to all commercial and co-operative banks, small finance banks, payment banks and NBFC from not only dealing in virtual and digital crypto currencies themselves but also restricting them to halt services to all entities which deal with such virtual currencies.^{[3][1]}

During the month of March, 2018, the Central Board of Digital Tax (CBDT) submitted a draft proposal to the ministry of finance for banning virtual currencies. A month later, the RBI issued a circular which directly restrained banks and other financial institutions from providing financial services to virtual currency exchanges operating in the country. Former RBI deputy governor BP Kanungo followed by Central Board of Direct Taxes (CBDT) chairman Sushil Chandra voiced their perspective in favour of banning crypto-currencies. Chandra said it creates “a chain of black money” and also mentioned that searches conducted into exchanges dealing with virtual currencies like Bitcoin had revealed that most uninformed people in interior places are being lured to buy it and may get in trap.

This slowed down the rise of the crypto industry in India, as exchanges ultimately required banking services for various transactions, sending and receiving the final amount. The banking service serves as the backbone for the conversion into crypto-currency and in turn for paying salaries, vendors, and other infrastructure like office space. However, the situation existing around crypto-currencies and their usage /trading completely took a paradigm shift on 4th March 2020, when the Hon’ble Supreme Court of India, in a well observed judgment quashed the earlier ban imposed by the RBI.

The Hon’ble Supreme Court of India predominantly examined the matter from the perspective of Article 19(1)(g) of the Indian Constitution, which talks about the freedom to practicing any profession or to carry on any occupation, trade or business, and the doctrine of proportionality.^{[1][3]}

The Apex Court also observed that there is ambiguity of opinion among all regulators and governments agencies of other countries that though such virtual currencies have not acquired the status of legal tender, however they do display digital representations of actual value and are capable of functioning as medium of exchange, unit of account and/or store of such value in terms of digital currency. While the court consider and recognized the RBI’s power to take a pre-emptive action, and pronounced that the proportionality of such a calculative measure was not there in the case, since there wasn’t any harm or loss suffered directly or indirectly, by RBI’s regulated entities as a result of trading virtual currency. Moreover, among other reasons, on the grounds of proportionality the impugned Circular dated 06-04-2018 was set aside.^[5]

(a) Paradigm Shift in the World of Crypto

The Government of India then considered the introduction of a complete new bill titled “Crypto-currency and Regulation of Official Digital Currency Bill, 2021” (“Absolutely New Bill”) which is similar in strength to its former versions. However, this bill points to ban private crypto-currency ventures in India with some exceptions, to encourage the underlying technology and trading of crypto-currency but facilitated them within a defined framework for the creation of an official such currencies further which will be issued by the RBI. The new bill take up a concern related to the difficulties associated with the lack of crypto-currency laws and suggests banning all the private crypto-currencies in its entirety. The dichotomy in this present bill recommendation arises since the RBI is in the grey about the types of crypto-currencies those will fall under the purview of private crypto-currency domain.

This new bill when imposes a complete ban on crypto-currencies, it may lead virtual currency investors to invest and deal in a venture which would be the part of completely unregulated market. Apart from that, the objective of introducing a law related to crypto-currency is to facilitate the process of trading and holding, in a safer and secure technological platform. However, even with the introduction of decentralized currencies which shall be monitored by the regulating body like RBI (in case of India), the severity of risk involved in investment and holding such commodities shall remain the same. ^{[2][6]}

(b) Crypto Status From January To October 2021

“A high-level Inter-Ministerial Committee (IMC) formed under the Chairmanship of Secretary (Economic Affairs) to study the issues related to virtual currencies and propose specific actions to be taken in the matter suggested in that report that all private crypto-currencies, except any virtual currencies issued by the state, will be prohibited in India,” Finance Minister Sitharaman said in Rajya Sabha on February 9. Minister of State for Finance Anurag Thakur also represents in Parliament that the government planned to bring a Bill on crypto-currencies as the existing laws were deemed inadequate and are insufficient to deal with the issues associated with crypto-currencies.

Apart from that, a report also revealed that India could propose a law banning crypto-currencies, fining anyone dealing and trading in the country or even holding such digital assets, a senior government official told Reuters at the time. Days after the report launched, in an interview on March 5, Sitharaman revealed that she wants to foster innovation in crypto. “We want to make sure that there is a window available for all kinds of experiments which will have to take place in the crypto world,” she said during an interview on CNBC TV18. “We are not closing our minds.”

Further, in November 2021, the Standing Committee on Finance, chaired by BJP member Jayant Sinha, tied up representatives of crypto exchanges, Blockchain and Crypto Assets Council (BACC), among others, and came with flying colors conclusion that crypto-currencies should not be banned, but yes must be regulated.

Earlier in the same month, Prime Minister Narendra Modi also called a meeting on crypto-currencies with senior officials and agencies. The minute indication was towards strong regulatory steps probably be taken to deal with the concerns and issues associated with crypto. Contrarily, the Reserve Bank of India has iteratively underlining its strong view against crypto-currencies, mentioning these pose a serious threat to the macroeconomic and financial stability of the nation. It has also raised doubts on the actual number of investors trading on crypto-currencies and their claimed market value. RBI Governor Shaktikanta Das repeated his oppositions to crypto-currencies, reiterating these pose a serious threat to any financial system since they are unregulated by central banks. The RBI announced its intent to come out with an official digital currency in the face of the proliferation of crypto-currencies, as the central bank has had still plethora of concerns.

Sitharaman also termed crypto-currency as a “risky area” during her speech in Rajya Sabha. According to her they are yet to take a call on advertisements around crypto-currency. The statement comes a day after she was quoted as saying in the Lok Sabha that there was no proposal to recognising virtual currencies in India. “This is a risky area and not in a complete regulatory framework. No decision was taken on banning its advertisements. Steps are taken to create awareness through RBI and SEBI. The government will soon introduce a Bill,” Sitharaman quoted during the Question Hour in Rajya Sabha. The Finance Minister in her earlier had also said that the government does not collect data on Bitcoin transactions. ^{[6][7]}

(D) Crypto Companies Patience Test

The information crypto companies should take into consideration in the absence of a defined regulatory framework in India in terms of virtual currency sector:

The government’s approach towards virtual currency (crypto) is taken into consideration and investing companies should be patient enough as government official Sitharaman summed up in Stanford University this matter cannot be taken in rush. Exchanges can expect higher chances of obtaining more clarity sooner.

Secondly, crypto exchanges recently, signal intent to levy an additional 20% tax on gains earned on crypto-currencies from platforms outside of India which also indicates unclear picture for the industry for longer time. The significant challenges of regulatory oversight of crypto-currency at the moment is the need to identify which existing laws and rules apply, and which area needs entirely new laws. The right law firm are in position to help companies in evaluating tax and regulatory regime and avoid expensive operational and legal mistakes made by crypto exchanges..

Finally, despite these dreadful challenges, India continues to offer momentous promise for crypto-currency exchanges. For an instance, companies like Coinbase identifies that India's population is changing youngest mindset with Internet penetration and hence digital asset adoption rates are highly expected to climb. Exchanges will have to assess the period they may have to to get appropriate news on these recent developments.

(e) Current Situation of Crypto-Currency in India

By the end of March 2021, as per the latest amendments to the Schedule III of the Companies Act, 2013, the Government of India pronounced that from the beginning of the next fiscal financial year, companies have to disclose the details of their investments in crypto-currencies. In other words, organizations must disclose gains or loss on trading transactions involving crypto-currency, the total portfolio comprising amount of holdings, and details about the deposits or advances from any person trading or investing in such ventures. The move has been greatly appreciated by the interested investor and traders dealing in the crypto sector, as it will open the door for most of the Indian companies to have Crypto on their balance sheets and business platforms.

Crypto-currency in India has covered a longer distance and touches greater milestones in a shorter time. Digital currency exchanges were virtually nonexistent and decentralized. However, approximately 15–20 million investors are holding more than \$5.3 billion in such ventures, according to a report, citing industry estimates, representing the second-largest number of crypto traders among world. Virtual currencies like Bitcoins have garnered particular traction among India's millennial population.

During the Union Budget 2022, Nirmala Sitharaman (Finance Minister, India) introduced a flat 30 % tax on all gains arising from the sale of virtual digital assets, including cryptocurrencies like Bitcoins and 1 per cent TDS on all crypto transactions.^{[1][2][3]}

(f) Crypto Taxation Without Legalization

In February, 2022, Nirmala Sitharaman (Finance Minister- India) announced plans to launch its own crypto-currency by next year and unveil two new taxes on digital currencies: a staggering 30% tax on income generated from crypto transactions and a separate 1% tax on "source on all transactions," which would be imposed on the exchange itself. There has been extraordinary increase in transactions in virtual digital assets. The degree and frequency of virtual asset transactions have made it the essence to provide for a specific tax regime. Apart from that trading volume of Indian exchanges plummeted sharply by nearly 70% according to industry data, with some exchanges experiencing plunges even greater than 90%. Industry experts have begun to warn of other far-reaching consequences those are involved in crypto-currency sector. Despite this, many assert and believe that the government had finally legitimized crypto-currencies in India by imposing the new taxes. Binance one of the prestigious crypto exchanges triumphantly declared, "Crypto just became legal in India and the Indian government has cleared dilemma in the form of a crypto asset tax law.

T. Rabi Sankar (Deputy RBI Governor) was even more direct concerned that digital currency may be worse than a Ponzi scheme, and that banning crypto-currency is the most advisable choice for India.

Nischal Shetty, (founder and CEO of WazirX, Crypto exchange) was more calculative and is of opinion that India is finally on the path to legitimizing the crypto sector in country and that the new taxes would remove "any ambiguity for banks, and institutions can provide financial services to the crypto industry." The government's decision to tax digital currencies did not mean they were suddenly legal.

According to T.V Somanathan (Finance Secretary, India), Bitcoin, Ethereum or NFT will never become legal tender and reflected. The government was taxing earnings at the exact same rate as "winnings from horse races, or from bets and other speculative transactions."

IV. CONCLUSION

In lieu of the inference drawn from the aforementioned facts and the present global scenario dealing with matters of crypto-currencies, it is perceptible that there is a complete lack of clarity concerning crypto-currency laws and regulation in India. Clearly defined, regulations dealing with virtual assets like crypto trading exchanges, block-chain technology, investors and the people employed in these sectors should be made the priority provided they compliance and cooperate the law of land. It is enthralling and pertinent to mention in the Draft National Strategy on Blockchain, 2021, published by the Ministry of Electronics and Information Technology highlighted the benefits of crypto-currency. As banning virtual currency has created an impact in many countries will not be the ideal thing to do for the development in nation like India and hence governments have moved ahead touching the few areas like taxation against gains however, a lot is required to be done in nearer future.

It was announced by in the month of March 2021 by the Nirmala Sitharam (Union Finance Minister, India) that there shall not be a complete ban on crypto-currency and keeping the promises intact they have introduced a flat 30 % tax on all gains arising from the sale of virtual digital assets, including crypto-currencies like Bitcoins and 1 per cent TDS on all crypto transactions in Union budget 2022.

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Designed Imidazole-Thiadiazolic Chalcone Targeting Falcipain-2 Receptors: Molecular Docking Studies

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ABSTRACT

Introduction: Novel synthesized heterocyclic compounds exerted their predominant biological action which has been based on the particular hetero atom and type of substituent's present in the ring. Molecular docking is a part of modern drug design which has been routinely used for better understanding of drug receptor interaction. In this paper, some heterocyclic compounds which are chalcone based Imidazo-thiadiazole moieties 10a to 10z were designed and subjected to the molecular docking study which has been referred to as very important tools for novel drug discovery.

Methods: A series of novel chalcone based different substituted Imidazo-thiadiazole derivatives were computationally designed through Claisen-Schmidt condensation reaction and evaluate the prescribed interaction on the basis of docking performance. In this study, Falcipain-2 receptors has been selected and used as a suitable target for designed derivatives where, designed synthetic compounds were optimized with autodock 4.0 and investigate the interaction between chalcone derivatives and amino acid residues of the Falcipain-2 receptors.

Results: Molecular docking results suggested that the cytotoxic activity of the designed derivatives might be due to their inhibition of falcipain-2. As compare to Consensus Score values, compound 10f and 10j with Consensus Score values 6.60 and 6.60 respectively. Several compounds exert strong hydrogen bonding interactions with amino acid residues where other parameters could also shows particular potency to inhibit falcipain-2.

Conclusion: Hence, predicted synthetic chalcone based substituted imidazo-thiadiazole derivatives can be considered as potent falcipain-2 inhibitor and come up with novel as a potential and advanced lead molecule for anticancer activity.

Keywords: Chalcone, Molecular docking studies, Imidazo-thiadiazole, Anti-cancer activity.

INTRODUCTION

Many organic synthesis and naturally occurring compounds conclusively targeted for drug discovery which is primary intension of heterocyclic derivatives in chemistry. A natural and synthesized compound along with its derivatives has been tested for their predominant biological activities which is a significant condition for process of drug development and discovery based upon targeted disease process. Cancer is general term which signalize the number of disease where growing or expansion of uncontrolled cells in a human body due to dysfunction of regulating pathways which are customarily in control.^{1,2} In cancer, tissues and organs rapidly get infected by parent cells and transmissions occurred at higher state. Different types of cancers has been identified in human body but they possesses unique characteristics.³ Cancer has been considered in a type of fast spreading disease and become a most dangerous as compare to other cellular disease. In present decade, peoples get suffered from different cancer disease not only in poor financial countries but also in well-developed countries where cancer having higher spreading ratio with higher mortality rate. Cancer is caused and developed due to genetically or behavioral factor in which up to 95% peoples affected with alternative lifestyle including diet, tobacco, obesity, stress, pollutant and lack of physical activities.⁴ Ultraviolet radiations and infections are also considered as leading factors for development of cancers. In other hand tobacco consist of fifty known carcinogens along with nitrosamine and polycyclic aromatic hydrocarbons hence one fifth cancer death occurs due to tobacco and others related to obesity, physical activities and diet.⁵ Physical inactivity contributes in the induction of cancer which includes the negative effect of body weight on immune system as well as endocrine system which is considered as a leading factor in cancer risk. Physical inactivity is also a major factor in cancer risk due to its effect on body weight and negative effects on endocrine and immune systems. High diet with lesser fruits and vegetables as well as higher processed meats also considered as effective factor and associated

with different cancers where infectious disease also been effective through area wise for cancer deaths.⁶ Different viruses also having predominant role in development of cancer like cervical carcinoma developed due to human papilloma virus other virus such as human T-cell leukemia virus, Kaposi sarcoma herpes virus and hepatitis B & C virus.⁴

Chalcone is a class of flavonoids bearing the 1,3-diphenyl-2-propen-1-one framework consist of two aromatic rings which are bridged by three carbons having α , β -unsaturated carbonyl system. Anthochlor pigments which is another name for chalcone appeared in yellow color convert to red in presence of alkali. Naturally occurring chalcones present in scrubs or ferns to higher plants.⁸ where most of them are polyhydroxylated in aromatic rings. In plant, stereospecific reaction such as conversion of chalcone to corresponding flavanone generated by enzyme chalcone isomerase by catalysis as they are very close according to structural and biogenic properties. In other hand it is acts as a starting material for biosynthesis of flavonoids and isoflavonoids as well as exhibits different biological activities through secondary metabolites of particular global plants.^{7,9,10} Chalcones possessing intermediate properties in different heterocyclic synthesis such as pyrazole, isoxazoles, triazole, coumarine etc.¹¹ Naturally occurring and synthetic chalcone possesses several biological activities such as anticancer,¹² anti-inflammatory,¹³ antiulcerative,¹⁴ antimicrobial,¹⁵ antimalarial¹⁶ activities due to presence of α , β -unsaturated keto group in heterocyclic moieties.

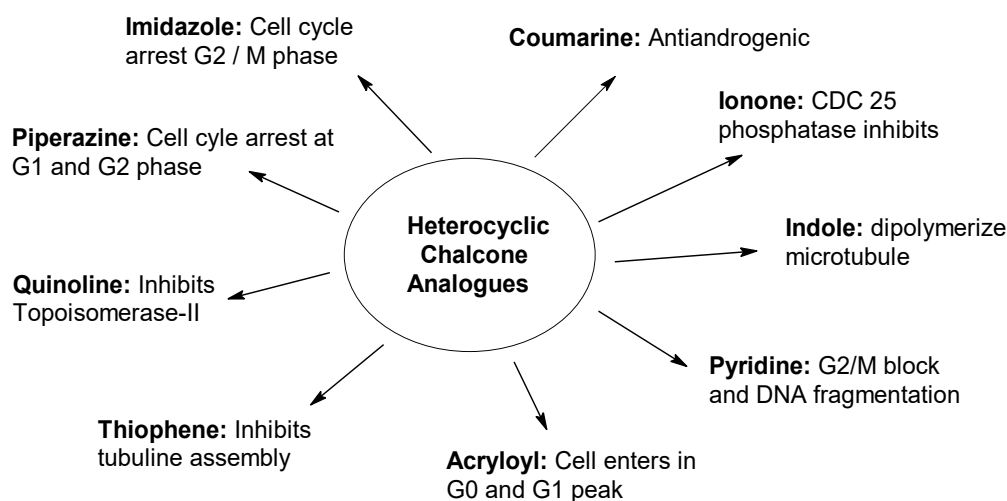


Fig.-01

Fig. 1. Schematic representation of chalcone analogues

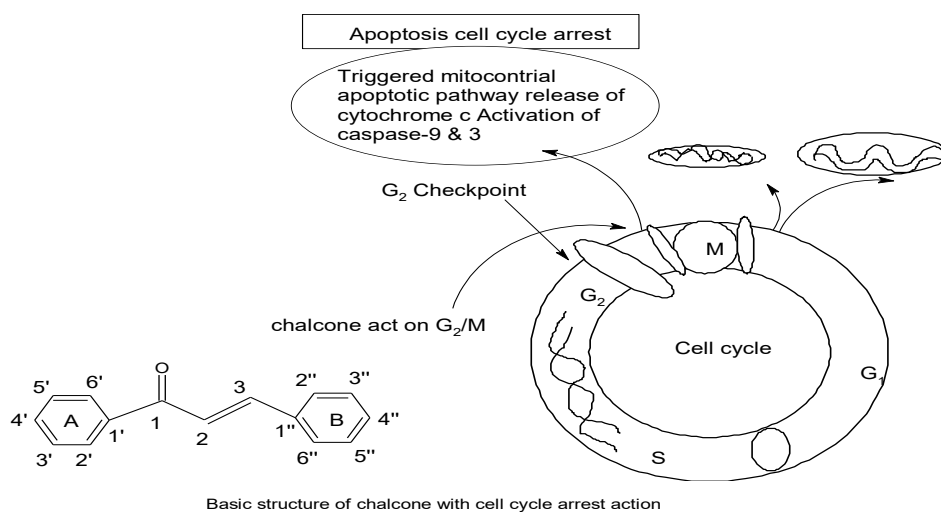


Fig.-02

Fig. 2. Mechanism of action and arrest of basic structure of chalcone on cell cycle.

Recent investigation shows the substitution of hydroxy or methoxy group with other heterocyclic ring on both the A and B ring of chalcone derivatives induces apoptosis in cancer cells.^{17,18,19} In few research studied extensively regarding impact of various active substituents with or within cyclic ring as well as replacement of aryl ring with other active heterocyclic ring which are directly related to improvement of cytotoxicity.^{20,21}

Background for Molecular Docking

Molecular docking is one of the prominent methods to predict preferred orientation which get introduced to study of interaction between ligand and receptor for invention of new drug discovery on the basis of molecular movement with stable complex. In docking program computer based representations has been shown and describes the variety of conformations, positions and orientations of small molecule towards the target. In drug discovery process binding of small molecules with targets according to biological interest is a very crucial and important step. Prediction of best-fit orientation or binding position of synthesized drug with particular protein target has been intermittently determined by docking studies along with affinity and activity forecasting in which it can anticipate the intermolecular complex structure.²² Protein ligand interactions having applications in medicines where this small ligand interacts and binds with protein binding sites through mutual conformations which are called as binding modes which is based on three dimensional structures. So, molecular docking possesses significant role in modern and rational drug design with understanding of drug receptor interaction. It is also shown biological and pharmaceutical significance throughout different synthetic works.²³ A compound containing active sites which has been hits on target compared to other moieties present in particular compounds identified and achieved by in silico or virtual screening method. Structure-based virtual screening (SBVS) is common technique has been applicable when three dimensional structure of target is available. Pose prediction is nothing but the favorable pose identified by energetically through docking mode and this docking mode or pose has been evaluated in the form of 'scored' which is totally based on bonding with target according to shape and electrostatic properties.²⁴

Recently, Ratchanok Pingaew and co-workers studied molecular docking of substituted novel chalcone coumarin hybrid as a anticancer and antimalarial agents which shows good prescribed activities of the hybrids might be due to their inhibition of tubulin and falcipain-2, respectively.²⁵ L. Kaviarasan et.al studied and designed synthetic molecules for molecular docking studies with targeting to active site of gamma secretase inhibitors which shows more favorable results for interaction with gamma secretase inhibitors on the basis of calculated docking energies.²⁶ SA Morsy et.al studied and designed novel synthetic derivatives of coumarin from 4-bromomethylcoumarin derivatives which on docking with active site of CDK2 gives satisfactory results which has been performed with protein 1KE9 to investigate the binding mode of designed synthetic compounds. Due to strong inhibition of CDK2 it is expected that the synthetic target compounds will give antiproliferative activity.²⁷ A new series of imidazothiadiazole-chalcones were designed and synthesized by Ahmed Kamal and co workers which has been evaluated for their cytotoxic activities against four representative human cancer cell lines. all synthetic modified chalcone derivatives exerted moderate to good cytotoxic activity against the cancer cell lines due to down-regulation of CDK4 and cyclinD1 proteins.²⁸

According to a recent study and review of the literature, different chalcone based heterocyclic moieties exerted anticancer activities. Hence current study includes molecular docking analysis of proposed designed chalcone containing imidazothiadiazole derivatives against falcipain-2 receptors.

MATERIALS AND METHODS

Proposed synthetic scheme

7-Substituted-3-((2E)-3-[2,6-substituted-imidazo[2,1-b][1,3,4]thiadiazol-5-yl]prop-2-enoyl)-2H-chromen-2-one

Proposed synthesis of substituted 1,3,4-thiadiazoles(3):²⁹

In a mixture of substituted benzoic acid (0.007 mol) and thiosemicarbazide (0.006 mol) add phosphorous oxychloride (0.027 mol) dropwise. The reaction mixture would heat to 85⁰C for 30 min. cool the mixture, add 7.5ml distilled water and reflux for 4 hours. Resulting mixture would cool at 25-30⁰C and should basified with 50% NaOH or KOH with drop wise addition under continuous stirring. Separated solid should filter, washed with water and recrystallized with appropriate solvent.

Proposed synthesis of substituted imidazo [2, 1-b]-1, 3, 4-thiadiazoles (5):³⁰

A mixture of equimolar quantities of substituted substituted 1, 3, 4-thiadiazoles (0.01 mol) and substituted phenacyl bromides (0.01 mol) would refluxed in dry ethanol for 24 hours. The excess of solvent would distilled off or remove under reduced pressure. The solid hydrobromide salt should collect by filtration, suspend it in water and neutralized by sodium carbonate to get free base. The product should filter, washed with water, dried and recrystallized from suitable solvent.

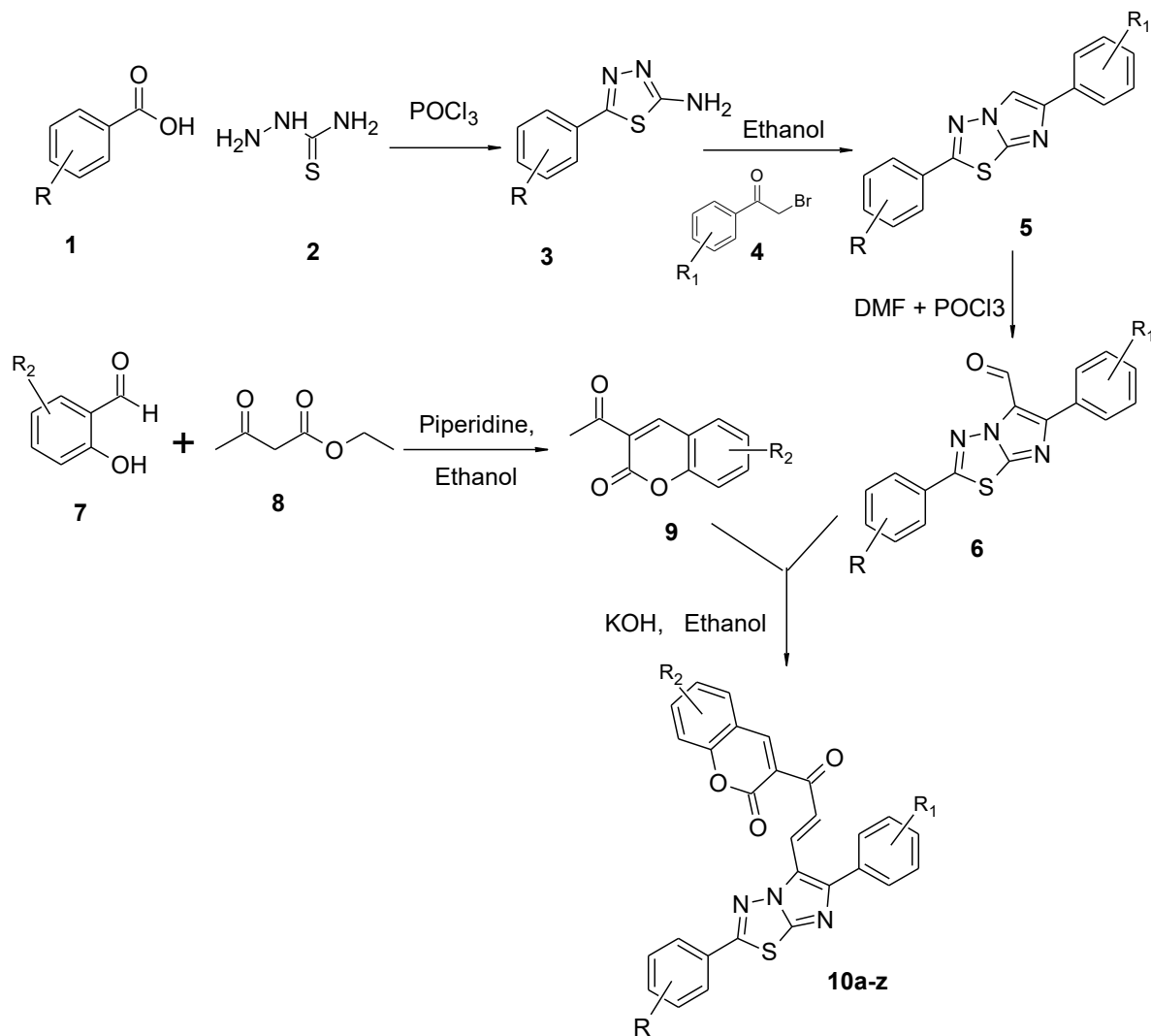


Fig. 3. Proposed synthetic scheme

Table 1. Proposed Substitutions In Synthetic Scheme

Compound Name	R	R1	R2
10a	-H	-H	-H
10b	-OH	-H	-H
10c	-NO ₂	-H	-H
10d	-OCH ₃	-H	-H
10e	-NH ₂	-H	-H
10f	-Cl	-H	-H
10g	-CH ₃	-H	-H
10h	-H	-OH	-H
10i	-H	-NO ₂	-H
10j	-H	-OCH ₃	-H
10k	-H	-Cl	-H
10l	-H	-H	-OH
10m	-H	-H	-CH ₃
10n	-H	-H	-OCH ₃
10o	-OH	-NO ₂	-CH ₃
10p	-NO ₂	-OCH ₃	-OH
10q	-OCH ₃	-OH	-OCH ₃
10r	-Cl	-NO ₂	-OH
10s	-NH ₂	-OH	-CH ₃
10t	-CH ₃	-NO ₂	-OH
10u	-OH	-NO ₂	-H

10v	-NO ₂	-OH	-H
10w	-NO ₂	-Cl	-H
10x	-OH	-Cl	-H
10y	-Cl	-NO ₂	-H
10z	-Cl	-OH	-H

Proposed synthesis of substituted imidazo[2,1-b][1,3,4]-thiadiazole-5-carbaldehydes(6):³¹

Vilsmeier-Haack salt would synthesized by adding phosphorous oxychloride (1.49 ml, 16.06 mmol) drop-wise to a Dimethyl formamide (1.23 ml, 16.06 mmol) maintaining temperature at 0-5⁰C. Later, a solution of previous step product (2.0 g, 8.032 mmol) in 20 ml of DMF would be added to the resulting solution. The reaction mixture should stir at 60⁰C for about 6 h. The container should cooled and poured into ice cold water with stirring. The solid obtained would be filtered, washed with water and then purified by recrystallization using appropriate solvent.

Proposed synthesis of substituted 3-acetyl coumarin (9):³²

2 ml of piperidine would added to a cold mixture of substituted salicylaldehyde (0.2 mol) and ethylacetoacetate (0.2 mol), with continuous stirring for 20 min. to get yellowish solid. The product would filtered and washed with ethanol and recrystallised from water and ethanol

Proposed synthesis of 7-Substituted-3-((2E)-3-[2,6-substituted-limidazo[2,1-b][1,3,4]thiadiazol-5-yl]prop-2-enoyl)-2H-chromen-2-one (10a-z):³³

Equimolar quantities (0.001 mol) of substituted coumarin or simple acetophenones and respective substituted aldehydes (0.001 mol) should mix and dissolved in minimum amount of alcohol. To this, aqueous potassium hydroxide solution (0.003 mol) would add slowly and stir for 2 hrs and should kept for 14-16 hr at room temperature. Resulting reaction mixture would pour into ice water and acidified with dil. HCl. The separated solid should filter and dried and recrystallized from appropriate solvent.

Molecular Docking:

Molecular modeling was carried out using Sybyl-X, version 2.1,³⁴ running on an Intel®Core™i3-2130 CPU@ 3.40GHz processor using Windows 7 professional workstation. The surflex-Dock algorithm of Sybyl-X 2.1 was used to dock designed compounds. The Crystal structure of Falcipain-2 with its inhibitor, E64 was downloaded from the Protein Data Bank (PDB entry code 3BPF; PDB extracted from the Brookhaven Protein Database <http://www.rcsb.org/pdb>) and used for initial docking studies. The co-crystallized ligand was removed from the structure, water molecules were removed, essential -H atoms were added and side chains were fixed during protein preparation. The structure was then subjected to an energy refinement procedure. Gasteigere-Huckel charges³⁵ were calculated for the ligand, while Amber7FF02 was used for the protein. The model was then subjected to energy minimization following the gradient termination of the Powell method for 3000 iterations using Tripos force field with non-bonding cutoff set at 9.0 and the dielectric constant set at 4.0. The binding of the Imidazo-thiadiazole based Chalcone derivatives was also estimated using a variety of scoring functions that have been compiled into the single consensus score (CScore).

RESULT AND DISCUSSION

To investigate the detailed intermolecular interactions between the ligand and the target protein, a program Surflex-Dock was used. Three-dimensional structure information on the target protein was taken from the PDB entry 3BPF. Processing of the protein included the deletion of the ligand and the solvent molecules as well as the addition of hydrogen atoms. All the 26 inhibitors were docked into the active site of enzyme. The predicted binding energies of the compounds are listed in Table 2. Figures 3, 4, and 5 shows the docking of **3BPF ligand**, compound **10j** and compound **10f** in to the active site of enzyme. As depicted in the figures **3A** and **3B** the co-crystallized ligand, hydrogens of the terminal amine groups of the ligand interacts with amino acid residue ASN81, terminal oxygen atoms shows interaction with amino acid residue GLN36, CYS42, HIS174, hydrogen atoms of -NH and -OH interacts with amino acid residue ASN173, hydrogen of amine and oxygen of carbonyl group interacts with amino acid residue GLY83.

As depicted in the figure **4A** and **4B**, the compound **10j**, oxygen atom of the carbonyl group present at the 2nd position of coumarin ring shows hydrogen bonding interaction with a hydrogen of the amino acid residue HIS174 and TRP206, carbonyl group of present near chalcone bridge shows hydrogen bonding interaction with amino acid residue GLN36 and CYS42. As depicted in figure **5A** & **5B**, the compound **10f**, shows a similar types of interaction viz., oxygen atom of carbonyl group present at 2nd position of coumarin ring shows

hydrogen bonding interaction with amino acid residue CYS42, TRP43, oxygen atom of coumarine ring shows a hydrogen bonding interaction with amino acid residue GLY83, whereas, oxygen atom of carbonyl group near chalcone bridge shows a hydrogen bonding interaction with amino acid residue CYS42, GLN36.

Table 2. Surflex Docking Score (Kcal/Mol) Of The Chalcone Based Limidazo[2,1-B][1,3,4]Thiadiazol Derivatives

Compounds	C Score ^a	Crash Score ^b	Polar Score ^c	D Score ^d	PMF Score ^e	G Score ^f	ChemScore ^g
3BPF-ligand	8.52	-1.25	10.12	2119.43	3.90	-193.50	-28.05
10a	6.09	-0.76	2.96	-1207.38	22.17	-172.94	-38.71
10b	6.14	-0.85	2.86	-1263.46	21.40	-180.43	-39.35
10c	5.68	-1.06	2.67	-1315.67	12.28	-185.33	-39.55
10d	6.51	-0.95	2.82	-1282.36	20.51	-189.18	-37.71
10e	6.30	-0.78	2.87	-1253.22	22.41	-186.96	-39.42
10f	6.60	-0.74	4.18	-1053.10	17.84	-131.30	-34.47
10g	6.42	-0.94	2.68	-1224.16	22.47	-192.96	-40.13
10h	5.24	-1.53	4.55	-1205.96	14.03	-147.71	-34.06
10i	5.91	-0.69	4.96	-1199.12	4.30	-135.67	-35.21
10j	6.60	-1.01	3.47	-1142.22	53.16	-134.87	-32.62
10k	5.27	-1.50	4.28	-1158.42	9.59	-156.13	-38.87
10l	6.48	-0.97	4.03	-1143.26	42.08	-120.38	-33.80
10m	5.94	-0.85	2.37	-1231.39	6.55	-185.11	-41.87
10n	5.42	-1.26	2.76	-1337.49	8.36	-189.44	-39.81
10o	5.82	-1.74	4.53	-1208.56	20.29	-165.40	-37.44
10p	4.76	-1.23	3.20	-1252.30	42.63	-143.69	-28.47
10q	6.34	-1.89	3.60	-1305.20	44.50	-184.09	-35.70
10r	4.68	-0.52	4.72	-1265.47	5.06	-118.54	-34.18
10s	5.69	-1.52	3.39	-1470.53	53.30	-165.12	-31.56
10t	6.00	-1.01	3.96	-1217.38	35.74	-172.58	-30.95
10u	5.25	-0.78	3.57	-1204.14	20.20	-132.00	-31.77
10v	5.52	-1.26	4.10	-1168.92	9.24	-137.87	-31.93
10w	4.80	-1.75	3.87	-1115.52	65.09	-174.67	-31.24
10x	5.48	-0.80	4.35	-918.88	38.24	-142.03	-31.15
10y	5.34	-1.51	3.74	-1301.85	-7.17	-200.07	-43.60
10z	5.49	-1.47	4.90	-1086.98	23.17	-147.64	-33.11

^aC Score (Consensus Score) integrates a number of popular scoring functions for ranking the affinity of ligands bound to the active site of a receptor and reports the output of total score.

^b Crash-score revealing the inappropriate penetration into the binding site. Crash scores close to 0 are favorable. Negative numbers indicate penetration.

^c Polar indicating the contribution of the polar interactions to the total score. The polar score may be useful for excluding docking results that make no hydrogen bonds.

^d D-score for charge and van der Waals interactions between the protein and the ligand (work of Kuntz).³⁶

^e PMF-score indicating the Helmholtz free energies of interactions for protein-ligand atom pairs (Potential of Mean Force, PMF) (work of Muegge and Martin).³⁷

^f G-score showing hydrogen bonding, complex (ligand-protein), and internal (ligand-ligand) energies (work of Willett's group).³⁸

^g Chem-score points for hydrogen bonding, lipophilic contact, and rotational entropy, along with an intercept term (work of Eldridge, Murray, Auton, Paolini, and Mee).³⁹

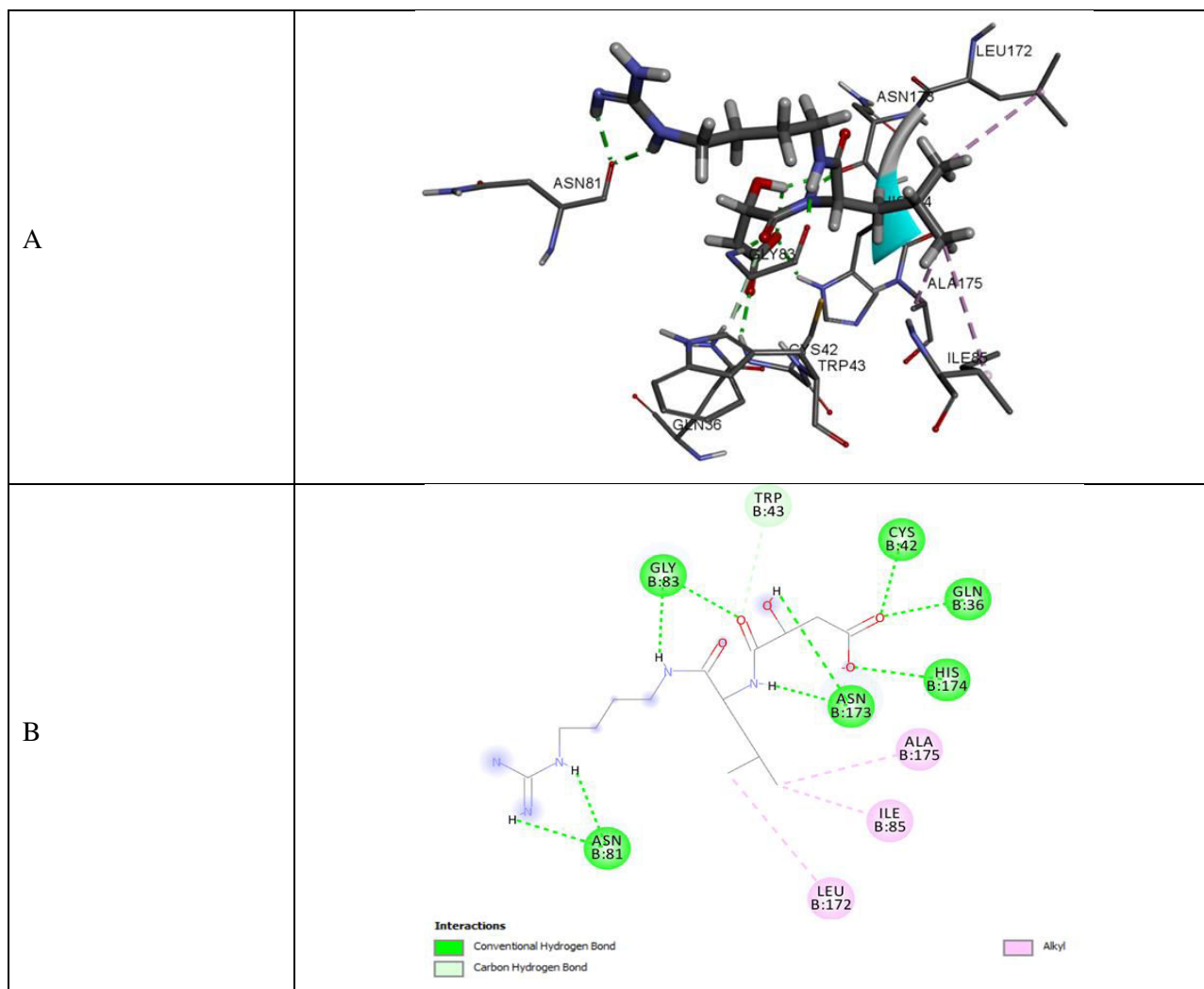
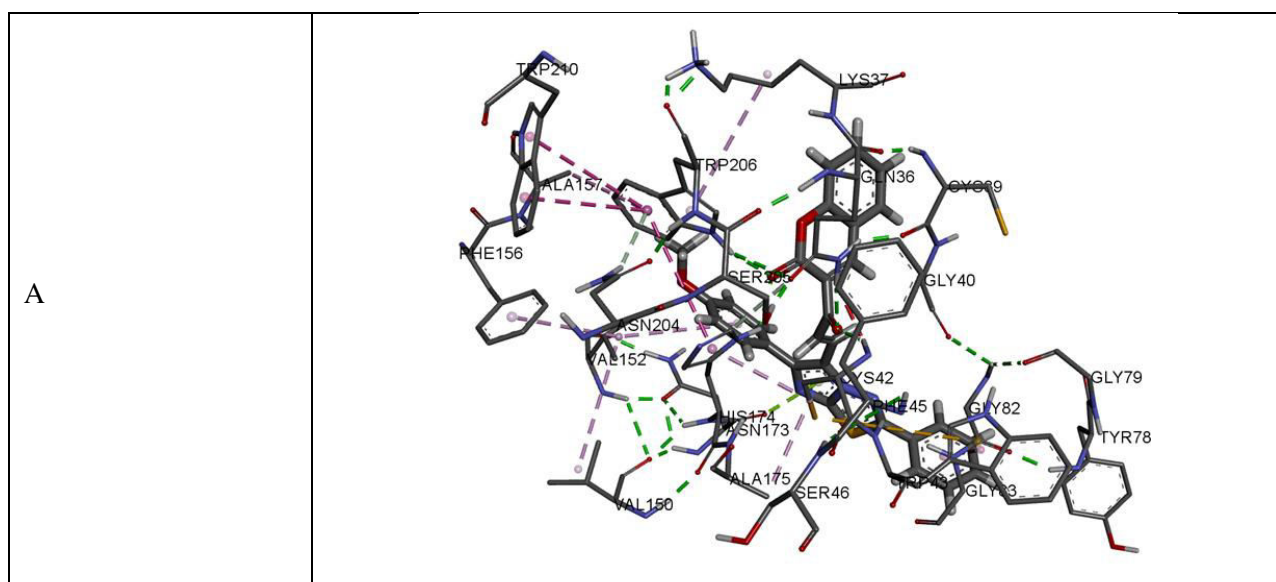


Fig. 3. Binding interaction of ligand at the active site of the enzyme



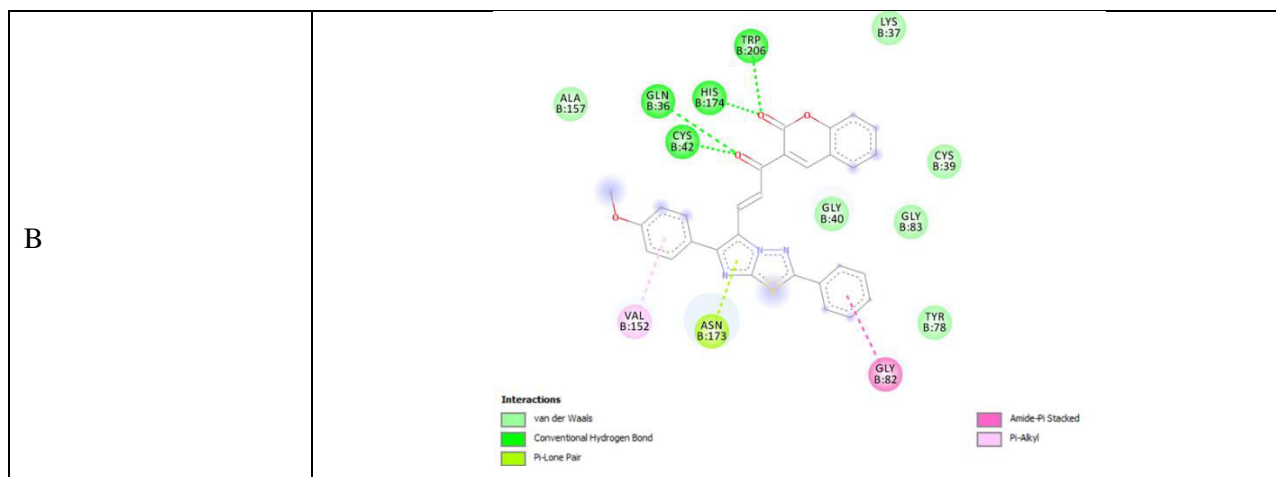


Fig. 4. Binding interaction of Compound 10j at the active site of the enzyme

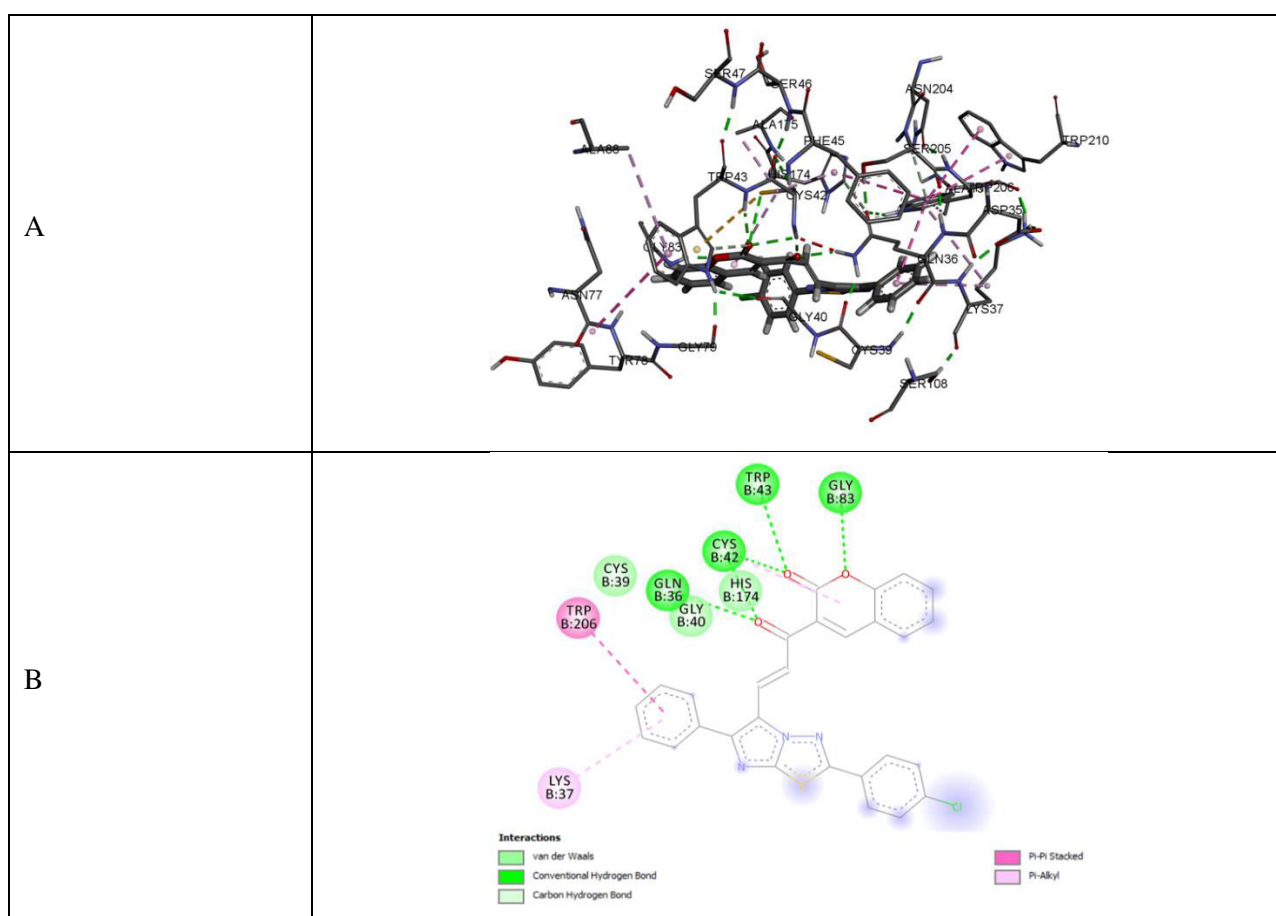


Fig. 5. Binding interaction of Compound 10f at the active site of the enzyme

CONCLUSION

In this current work, synthesis of chalcone based novel imidazo-thiadiazole derivatives has been proposed for synthetic procedure which is based on previous research works along with structural requirement of compounds and anticancer activity. As concern to above activity we prepared and designed different compounds and evaluated then with molecular docking studies. In order to obtain chalcone based substituted coumarin-imidazo-thiadiazole should follow the base catalyzed reaction like substituted acetyl coumarin could be treated with aldehyde substituted imidazo-thiadiazole in presence base. Molecular docking results suggested that the cytotoxic activity of the designed derivatives might be due to their inhibition of falcipain-2. As compare to Consensus Score values, compound 10f and 10j with Consensus Score values 6.60 and 6.60 respectively. So, on the basis of these analyzed data predicted synthetic derivatives can be considered as potent falcipain-2 inhibitor. This present study come up with novel chalcone based substituted imidazo-thiadiazole derivatives as a potential and advanced lead molecule for anticancer activity. Further structural optimization along with more experimental and analytical data required to confirm this predictive synthetic work.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

ml: Milli Liter; °C: Degree Centigrade; µg: Microgram; mg: Miligram; mmol: Milimolar, mol: Molar.

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Ultrasonically Synthesis of 3-Aryl-1-[3-(3-Methylphenyl)] [1, 8] Naphthyridin-2-Yl]-1h- 4-Pyrazolecarbaldehydes

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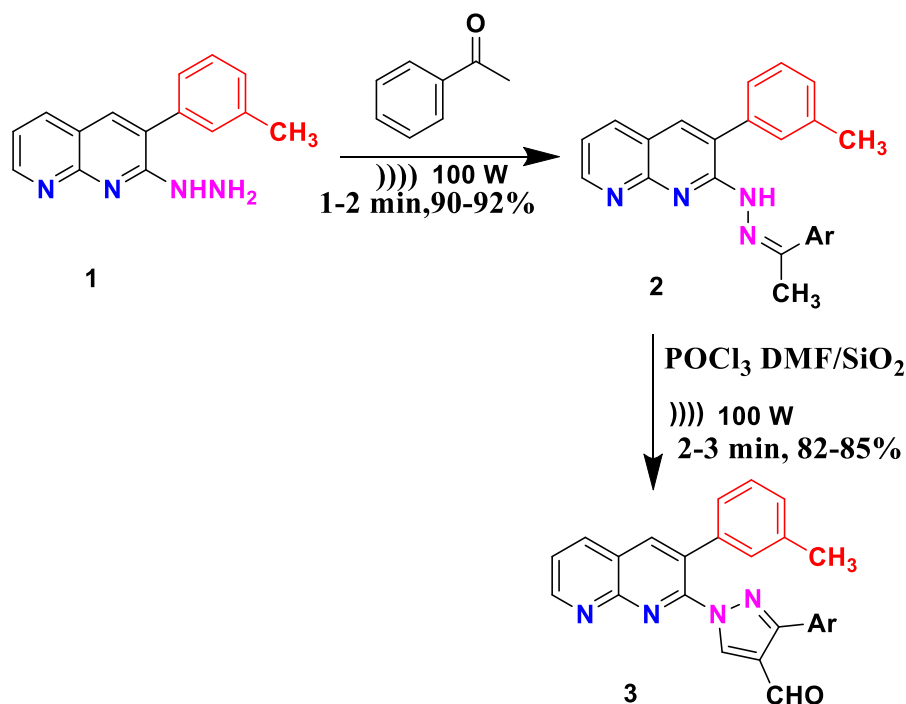
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ABSTRACT

Herein, we describe the condensation of 2-hydrazino-3-(3-methylphenyl)-1,8-naphthyridine **1** with different acetophenones in the presence of catalytic amount of DMF under US furnished the respective 1-aryl-1-ethanone 1-[3-(3-methylphenyl) [1,8]naphthyridin-2-yl] hydrazones **2** in excellent yields. When **2** subjected to the Vilsmeier-Haack reaction with POCl₃-DMF/SiO₂ under ultrasonication gave 3-aryl-1-[3-(3-methylphenyl)] [1,8]naphthyridin-2-yl]-1H-4-pyrazolecarbaldehydes **3** (Scheme I). Reactions are not time consuming and the yields of the products are good. The high yield transformation did not form any undesirable by-products. The purity of the product is high. The method is preoperatively convenient and useful.

GRAPHICAL ABSTRACT



Scheme I

Keywords: 1, 8-Naphthyridine, pyrazolecarbaldehydes, ultrasonically assisted synthesis.

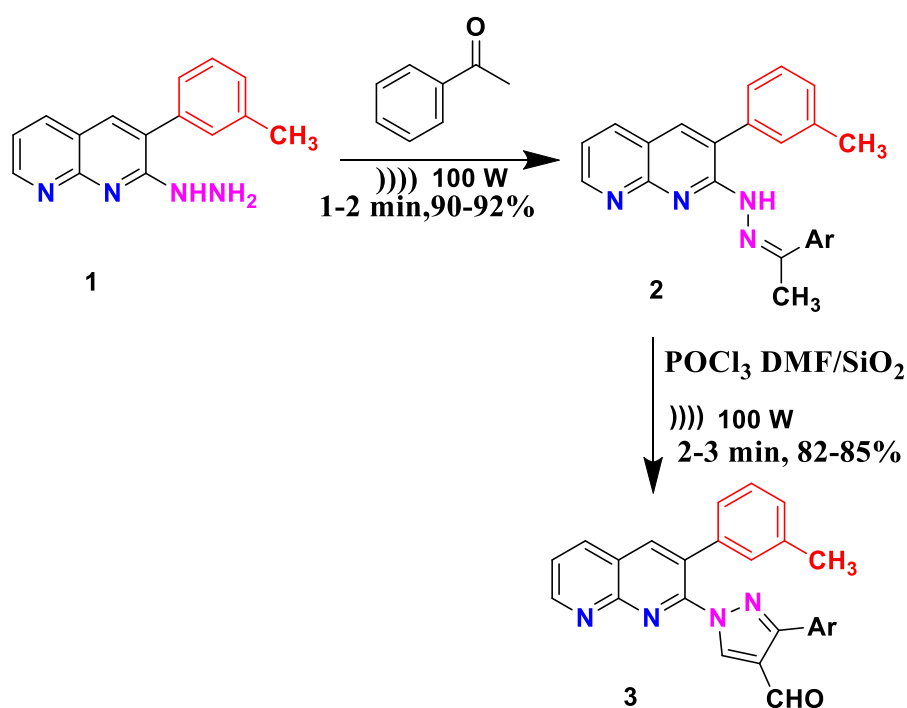
INTRODUCTION

Fused heterocycles are of considerable interest on account of their intriguing structural, chemical and biological properties. There are several methods available in the literature for the synthesis of fused N-based heterocycles¹⁻⁵. However, some of these methods suffer from disadvantages such as long reaction times, lower yields, requirement of severe conditions and using string or toxic oxidants. Therefore, the development of new methods with greater efficacy, straightforward procedures and better yields still desirable. 1,8-Naphthyridine derivatives have attracted considerable attention owing to their effective biological activity and extensive use⁶⁻⁸. Vijaykumar and co-workers¹⁰ described the synthesis and antimicrobial activity of 3-chloro-6-methoxy-benzothiophene-2-yl(substituted) carbonyl-1H-pyrazole-4-carbaldehydes. The synthesis and antimicrobial activity of 3-aryl-1-(2-(quinolin-8-yloxy)acetyl)-1H-pyrazole-4-carbaldehydes have been reported by Chaitanya et al.⁹

Iodobenzene diacetate [PhI(OAc)₂] is very versatile oxidizing agent and is of much importance in its synthetic utility. The development of new strategies for the preparation of organic molecules in neat conditions is a

challenging area of organic synthesis. For instance, a large number of organic reactions are typically carried out under anhydrous conditions, using volatile organic solvents like benzene, which are the cause of environmental problems and are also potentially carcinogenic. Heterocycle is a versatile lead molecule for designing potential bioactive agents¹¹⁻¹³. The Vilsmeier-Haack reaction of acetophenone phenylhydrazone resulted in the formation of pyrazole-4-carbaldehyde^{14,15}. In Vilsmeier-Haack reaction, DMF-POCl₃ has a dual role of reagent as well as solvent. POCl₃ is a highly toxic solvent and its use is hazardous to health and is also pollutant of the environment. 1,8-Naphthyridines play a pivotal role in the field of heterocyclic chemistry¹⁶⁻¹⁸. Ultrasonic chemistry has gained popularity as a non conventional technique for rapid organic synthesis; it is eco-friendly, economical and is believed to be a step towards green chemistry¹⁹⁻²². The solvent-free reaction²¹, in general and on inorganic solid supports²³ under this condition are especially appealing for providing an environmentally benign system.

Motivated by these facts, herein we describe an efficient, rapid and environmentally benign protocol for the synthesis of 1-Aryl-1-ethanone 1-[3-(3-methylphenyl)[1,8]naphthyridin-2-yl] hydrazones **2** and 3-Aryl-1-[3-(3-methylphenyl) [1,8]naphthyridin-2-yl]-1H- 4-pyrazolecarbaldehydes using POCl₃-DMF over silica gel under ultrasonically assisted synthesis **3** shown in scheme-1.



Ar	Ar
a: C ₆ H ₅	e: 4-Br C ₆ H ₄
b: 4-CH ₃ C ₆ H ₄	f: 3-NO ₂ C ₆ H ₄
c: 4-CH ₃ OC ₆ H ₄	g: 4-NO ₂ C ₆ H ₄
d: 4-Cl C ₆ H ₄	h: 2-Naphthyl

Scheme I

I Synthesis of 1-Aryl-1-Ethanone 1-[3-(3-Methylphenyl) [1,8]Naphthyridin-2-Yl] Hydrazones 2

Condensation of 2-hydrazino-3-(3-methylphenyl)-1, 8-naphthyridine **1** with different acetophenones in the presence of catalytic amount of DMF under MW irradiation furnished the respective 1-aryl-1-ethanone 1-[3-(3-methylphenyl) [1,8]naphthyridin-2-yl] hydrazones **2** in excellent yields.

In a typical case, a mixture of **1**, acetophenone (Ar = C₆H₅) and DMF (5 drops) was exposed to ultrasonication upto 2 min. On completion of the reaction (monitored by TLC), the reaction mixture was cooled to RT and digested with cold water. After work-up, 1-phenyl-1-ethanone 1-[3-(3-methylphenyl)[1,8]naphthyridin-2-yl] hydrazone **2a** (Ar = C₆H₅) was obtained in 92% yield.

The above condensation reaction was found to be a general one and proceeded smoothly with seven other substituted acetophenones giving the respective 1-aryl-1-ethanone 1-[3-(3-methylphenyl) [1,8]naphthyridin-2-yl] hydrazones **2b-h** (Ar=4-CH₃C₆H₄, 4-CH₃OC₆H₄, 4-ClC₆H₄, 4-BrC₆H₄, 3-NO₂C₆H₄, 4-NO₂C₆H₄, 2-naphthyl) (**Table V**).

The characterization of the hydrazones **2** has been done by elemental analyses and spectral (IR, ¹H NMR and MS) data.

IR Spectra

The IR (KBr) spectra of 1-aryl-1-ethanone 1-[3-(3-methylphenyl) [1,8]naphthyridin-2-yl] hydrazones **2** showed absorption bands around 3340 and 1615 cm⁻¹ due to NH and C=N groups, respectively. The data are listed in **Table I**.

Table I — Ir And Mass Spectral Data 1-Aryl-1-Ethanone 1-[3-(3-Methylphenyl)[1,8]Naphthyridin-2-Yl] Hydrazones 29

Compd	Ar	λ_{\max} in cm ⁻¹		MS(ESI) [M+H] ⁺ m/z
		NH	C=N	
2a	C ₆ H ₅	3343	1615	353.2
2b	4-CH ₃ C ₆ H ₄	3345	1613	367.2
2c	4-CH ₃ OC ₆ H ₄	3339	1612	383.2
2d	4-ClC ₆ H ₄	3340	1617	387.1
2e	4-BrC ₆ H ₄	3336	1617	431.1
2f	3-NO ₂ C ₆ H ₄	3335	1616	398.2
2g	4-NO ₂ C ₆ H ₄	3333	1615	398.2
2h	2-Naphthyl	3340	1614	403.2

¹H NMR Spectra

The ¹H NMR (300 MHz) spectra of 1-aryl-1-ethanone 1-[3-(3-methylphenyl) [1,8]naphthyridin-2-yl] hydrazones **2** were recorded in CDCl₃ and the data are recorded in **Table II**.

Table II — ¹H NMR spectral data of 1-Aryl-1-ethanone 1-[3-(3-Methylphenyl)[1,8]naphthyridin-2-yl] hydrazones 2

Compd	Ar	¹ H NMR (300 MHz, CDCl ₃) (δ, ppm)
2a	C ₆ H ₅	2.42 (s, 3H, CH ₃), 2.46 (s, 3H, CH ₃), 7.72 (m, 1H, C ₆ -H) 8.06 (m, 2H, C ₄ -H, C ₅ -H), 8.36 (m, 1H, C ₇ -H), 7.03-7.56 (m, 9H, Ar-H), 10.10 (s, 1H, NH).
2b	4-CH ₃ C ₆ H ₄	2.23 (s, 3H, CH ₃), 2.45(s, 6H, 2×CH ₃), 7.68 (m, 1H, C ₆ -H) 8.00 (m, 2H, C ₄ -H, C ₅ -H), 8.21 (m, 1H, C ₇ -H), 6.97-7.54(m, 8H, Ar-H), 10.05(s, 1H, NH).
2c	4-CH ₃ OC ₆ H ₄	2.42(s, 6H, 2×CH ₃), 3.86(s, 3H, OCH ₃), 7.60 (m, 1H, C ₆ -H) 7.90 (m, 2H, C ₄ -H, C ₅ -H), 8.19 (m, 1H, C ₇ -H), 6.94-7.35(m, 8H, Ar-H), 10.04 (s, 1H, NH).
2d	4-ClC ₆ H ₄	2.43 (s, 6H, 2×CH ₃), 7.62(m, 1H, C ₆ -H), 7.84(m, 2H, C ₄ -H, C ₅ -H), 8.22 (m, 1H, C ₇ -H), 7.21-7.55 (m, 8H, Ar-H), 10.02(s, 1H, NH).
2e	4-BrC ₆ H ₄	2.42 (s, 6H, 2×CH ₃), 7.67(m, 1H, C ₆ -H), 7.80 (m, 2H, C ₄ -H, C ₅ -H), 8.30 (m, 1H, C ₇ -H), 6.98-7.57 (m, 8H, Ar-H), 10.09 (s, 1H, NH).
2f	3-NO ₂ C ₆ H ₄	2.44 (s, 3H, CH ₃), 2.75 (s, 3H, CH ₃), 7.65 (m, 1H, C ₆ -H), 7.83 (m, 2H, C ₄ -H, C ₅ -H), 8.28 (m, 1H, C ₇ -H), 7.20-7.60 (m, 8H, Ar-H), 10.05 (s, 1H, NH).
2g	4-NO ₂ C ₆ H ₄	2.42 (s, 3H, CH ₃), 2.65 (s, 3H, CH ₃), 7.67 (m, 1H, C ₆ -H), 7.92 (m, 2H, C ₄ -H, C ₅ -H), 8.26 (m, 1H, C ₇ -H), 7.18-7.56 (m, 8H, Ar-H), 10.07 (s, 1H, NH).
2h	2-Naphthyl	δ 2.43 (s, 3H, CH ₃), 2.58 (s, 3H, CH ₃), 7.70 (m, 1H, C ₆ -H), 8.02 (m, 2H, C ₄ -H, C ₅ -H), 8.32(m, 1H, C ₇ -H), 7.15-7.52 (m, 11H, Ar-H), 10.10 (s, 1H, NH).

Mass Spectra

The ESI mass spectra of 1-aryl-1-ethanone 1-[3-(3-methylphenyl) [1,8]naphthyridin-2-yl] hydrazones **29** exhibited strong [M+H]⁺ ions (Table I).

ii Synthesis of 3-Aryl-1-[3-(3-Methylphenyl)][1,8]Naphthyridin-2-Yl]-1H-4-Pyrazolecarbaldehydes 3

The hydrazones **2** when subjected to the Vilsmeier-Haack reaction with POCl₃-DMF/SiO₂ under MW irradiation gave 3-aryl-1-[3-(3-methylphenyl)] [1,8]naphthyridin-2-yl]-1H-4-pyrazolecarbaldehydes **3** (Scheme I). Reactions are not time consuming and the yields of the products are good. The high yield transformation did not form any undesirable by-products. The purity of the product is high. The method is preoperatively convenient and useful. The process is environmentally benign. The experimental procedure is very simple.

In a typical procedure, to the Vilsmeier-Haack reagent, prepared from DMF and POCl₃ at 0-5°C, hydrazone **2a** (Ar = C₆H₅) and silica gel was added and is exposed to microwaves at 400 W intermittently at 30 sec intervals for 3.5 min. After usual work-up 1-[3-(3-methylphenyl)] [1,8]naphthyridin-2-yl]-3-phenyl-1H-4-pyrazolecarbaldehyde **3a** (Ar = C₆H₅) was obtained in 84% yield.

The generality of the facile Vilsmeier-Haack reaction was established by treating other hydrazones **2b-h** with POCl₃-DMF/SiO₂ under MW irradiation to get the corresponding 3-aryl-1-[3-(3-methylphenyl)] [1,8]naphthyridin-2-yl]-1H-4-pyrazole-carbaldehydes **3b-h** (Ar = 4-CH₃C₆H₄, 4-CH₃OC₆H₄, 4-ClC₆H₄, 4-BrC₆H₄, 3-NO₂C₆H₄, 4-NO₂C₆H₄, 2-naphthyl) (Table VI).

Interestingly, this reaction proceeds only to a minor extent (5-7% in 3.0-4.0 min) when conducted under conventional conditions in an oil-bath preheated to 120°C (measured immediately after MW irradiation) which confirms the rate increase during MW heating.

The structures of the compounds **3** were assigned on the basis of their spectral (IR, ¹H NMR and MS) and analytical data.

High yields of the products, easy work-up, short reaction times, excellent purity of the products and the elimination of the solvent are note-worthy advantages of the this method.

IR Spectra

The IR spectra of 3-aryl-1-[3-(3-methylphenyl)][1,8]naphthyridin-2-yl]-1H-4-pyrazolecarbaldehydes **3** displayed absorption bands around 1686(C=O) and 1610 cm⁻¹(C=N). The data are furnished in Table III.

Table III — IR and mass spectral data of 3-Aryl-1-[3-(3-methylphenyl)] [1,8]naphthyridin-2-yl]-1H-4-pyrazolecarbaldehydes **30**

Compd	Ar	λ_{\max} in cm ⁻¹		MS(ESI) [M+H] ⁺ m/z
		C=O	C=N	
3a	C ₆ H ₅	1682	1610	391.1
3b	4-CH ₃ C ₆ H ₄	1618	1608	405.2
3c	4-CH ₃ OC ₆ H ₄	1699	1611	421.2
3d	4-ClC ₆ H ₄	1691	1609	425.1
3e	4-BrC ₆ H ₄	1692	1614	469.1
3f	3-NO ₂ C ₆ H ₄	1686	1611	436.1
3g	4-NO ₂ C ₆ H ₄	1677	1612	436.1
3h	2-Naphthyl	1690	1610	441.2

¹H NMR Spectra

The ¹H NMR (300 MHz) spectra of 3-aryl-1-[3-(3-methylphenyl)] [1,8]naphthyridin-2-yl]-1H-4-pyrazolecarbaldehydes **3** were recorded in CDCl₃ and the data are recorded in Table IV.

Table IV— ¹H NMR spectral data of 3-Aryl-1-[3-(3-methylphenyl)] [1,8]naphthyridin-2-yl]-1H-4-pyrazolecarbaldehydes **3**

Compd	Ar	¹ H NMR (300 MHz, CDCl ₃) (δ, ppm)
3a	C ₆ H ₅	2.40 (s, 3H, CH ₃), 7.93 (m, 3H, C ₄ -H, C ₅ -H, C ₆ -H), 8.23 (m, 1H, C ₇ -H), 7.26-7.62 (m, 10H, CH of pyrazole, 9Ar-H), 9.68 (s, 1H, CHO).
3b	4-CH ₃ C ₆ H ₄	2.25(s, 3H, CH ₃), 2.42 (s, 3H, CH ₃), 7.96(m, 3H, C ₄ -H, C ₅ -H, C ₆ -H), 8.26 (m, 1H, C ₇ -H), 7.22-7.60 (m, 9H, CH of pyrazole, 8Ar-H), 9.66 (s, 1H, CHO).

3c	4-CH ₃ OC ₆ H ₄	2.40 (s, 3H, CH ₃), 3.87 (s, 3H, OCH ₃), 7.91 (m, 3H, C ₄ -H, C ₅ -H, C ₆ -H), 8.28 (m, 1H, C ₇ -H), 6.86-7.65 (m, 9H, CH of pyrazole, 8Ar-H), 9.64 (s, 1H, CHO).
3d	4-ClC ₆ H ₄	2.42(s, 3H, CH ₃), 7.67 (m, 3H, C ₄ -H, C ₅ -H, C ₆ -H), 8.30 (m, 1H, C ₇ -H), 7.27-7.62 (m, 9H, CH,Ar-H), 9.65(s, 1H, CHO).
3e	4-BrC ₆ H ₄	2.40 (s, 3H, CH ₃), 7.90 (m, 3H, C ₄ -H, C ₅ -H, C ₆ -H), 8.27(m, 1H, C ₇ -H), 7.08-7.72 (m, 9H, CH Ar-H), 9.68(s, 1H, CHO).
3f	3-NO ₂ C ₆ H ₄	2.42 (s, 3H, CH ₃), 7.94 (m, 3H, C ₄ -H, C ₅ -H, C ₆ -H), 8.25 (m, 1H, C ₇ -H), 7.15-7.68 (m, 9H, CH of Ar-H), 9.66 (s, 1H, CHO).
3g	4-NO ₂ C ₆ H ₄	2.41 (s, 3H, CH ₃), 7.88 (m, 3H, C ₄ -H, C ₅ -H, C ₆ -H), 8.21 (m, 1H, C ₇ -H), 7.20-7.72 (m, 9H, CH Ar-H), 9.68(s, 1H, CHO).
3h	2-Naphthyl	2.40 (s, 3H, CH ₃), 7.93 (m, 3H, C ₄ -H, C ₅ -H, C ₆ -H), 8.24 (m, 1H, C ₇ -H), 7.18-7.76 (m, 12H, CH Ar-H), 9.65 (s, 1H, CHO).

Mass Spectra

The ESI mass spectra of 3-aryl-1-[3-(3-methylphenyl)] [1,8]naphthyridin-2-yl]-1H-4-pyrazolecarbaldehydes **3** showed strong [M+H]⁺ ions (Table III).

Experimental Section

Thin layer chromatograms were run on Merck silica gel 60 F₂₅₄ precoated plastic sheets (layer thickness 0.2 mm). IR spectra (KBr) were recorded on a Perkin-Elmer spectrum BX series FT-IR spectrophotometer, ¹H NMR spectra on a Varian Gemini 300 MHz spectrometer, using tetramethylsilane as an internal standard (δ=0), and chemical shifts are reported in parts per million. Analysis of all new compounds gave satisfactory analytical results and was performed by Perkin-Elmer 240 CHN analyser. The 2-(trifluoromethyl)-phenylacetonitrile **2** was purchased from Aldrich Chemical Company.

I General Procedure For The Synthesis of 1-Aryl-1-Ethanone 1-[3-(3-Methylphenyl)][1,8]Naphthyridin-2-Yl]Hydrazones **2**

A mixture of 2-hydrazino-3-(3-methylphenyl)-1, 8-naphthyridine **1** (0.01 mole), appropriate acetophenone (0.01 mole) and DMF (5 drops) was subjected to ultrasonicator upto 2min intervals for specified time (Table V). On completion of the reaction (monitored by TLC), the reaction mixture was cooled to RT and digested with cold water. The solid obtained was filtered, washed with water and purified by recrystallization from ethanol to obtain **2** (Table V).

II General Procedure for the synthesis of 3-aryl-1-[3-(3-methylphenyl) [1, 8] Naphthyridin-2-Yl]-1h-4-Pyrazolecarbaldehydes **3**

To the Vilsmeier-Haack reagent (0.03 mole) at 0-5°C, compound **2** (0.01 mole) was added portion wise. After the addition was complete, the reaction flask was kept at RT for 5 min and silica gel (3 g) was added and properly mixed with the help of a glass rod, till free flowing powder was obtained. The powder is then irradiated in ultrasonicator upto 3min for specified time (Table VI). After the completion of reaction as monitored by TLC, the reaction mixture was cooled to RT treated with chilled water and filtered. The solid thus separated by the neutralization of the filtrate with NaHCO₃ was filtered, washed with water and purified by recrystallization from ethanol to afford **3** (Table VI).

Table V — Physical and analytical data of 1-Aryl-1-ethanone 1-[3(3-methylphenyl)-[1,8]naphthyridin-2-yl]hydrazones **2**

Compd	Ar	Reaction	m.p.	Yield	Mol. formula	Found (%) (Caclcd)		
		Time (min)	°C	(%)		C	H	N
2a	C ₆ H ₅	0.5	95	96	C ₂₃ H ₂₀ N ₄	78.50 (78.38)	5.73 5.72	15.94 15.90
2b	4-CH ₃ C ₆ H ₄	0.5	142	97	C ₂₄ H ₂₂ N ₄	78.77 (78.66)	6.07 6.05	15.32 15.29
2c	4-CH ₃ OC ₆ H ₄	1.0	138	95	C ₂₄ H ₂₂ N ₄ O	75.48 (75.37)	5.82 5.80	14.69 14.65
2d	4-ClC ₆ H ₄	1.0	160	98	C ₂₃ H ₁₉ ClN ₄	71.50 (71.40)	4.97 4.95	14.51 14.48
2e	4-BrC ₆ H ₄	1.0	130	96	C ₂₃ H ₁₉ BrN ₄	64.17 (64.05)	4.46 4.44	13.03 12.99

2f	3-NO ₂ C ₆ H ₄	0.5	215	94	C ₂₃ H ₁₉ N ₅ O ₂	69.62 (69.51)	4.83 4.82	17.65 17.62
2g	4-NO ₂ C ₆ H ₄	0.5	204	96	C ₂₃ H ₁₉ N ₅ O ₂	69.61 (69.51)	4.84 4.82	17.66 17.62
2h	2-Naphthyl	1.0	212	95	C ₂₇ H ₂₂ N ₄	80.69 (80.57)	5.52 5.51	13.97 13.92

Table VI—Physical and analytical data of 3-Aryl-1-[3-(3-methylphenyl) [1,8]naphthyridin-2-yl]-1H-4-pyrazolecarbaldehydes **3**

Compd	Ar	Reaction time (min)	m.p. °C	Yield (%)	Mol. formula	Found (%) (Caclcd)		
						C	H	N
3a	C ₆ H ₅	3.5	115	84	C ₂₅ H ₁₈ N ₄ O	77.02 (76.91)	4.67 4.65	14.38 14.35
3b	4-CH ₃ C ₆ H ₄	3.5	120	86	C ₂₆ H ₂₀ N ₄ O	77.31 (77.21)	4.99 4.98	13.89 13.85
3c	4-CH ₃ OC ₆ H ₄	3.0	98	84	C ₂₆ H ₂₀ N ₄ O ₂	74.39 (74.26)	4.80 4.79	13.35 13.32
3d	4-ClC ₆ H ₄	3.0	150	87	C ₂₅ H ₁₇ ClN ₄ O	70.78 (70.65)	4.05 4.03	13.23 13.19
3e	4-BrC ₆ H ₄	3.5	105	85	C ₂₅ H ₁₇ BrN ₄ O	64.09 (63.98)	3.66 3.65	11.99 11.94
3f	3-NO ₂ C ₆ H ₄	4.0	132	82	C ₂₅ H ₁₇ N ₅ O ₃	69.06 (68.94)	3.95 3.93	16.13 16.08
3g	4-NO ₂ C ₆ H ₄	4.0	110	84	C ₂₅ H ₁₇ N ₅ O ₃	69.08 (68.92)	3.94 3.93	16.11 16.08
3h	2-Naphthyl	3.5	145	85	C ₂₉ H ₂₀ N ₄ O	79.18 (79.05)	4.59 4.58	12.76 12.72

CONCLUSION

To the best of our knowledge this is the first report on rapid synthesis 1-Aryl-1-ethanone 1-[3-(3-methylphenyl)[1,8]naphthyridin-2-yl] hydrazones and 3-Aryl-1-[3-(3-methylphenyl)] [1,8]naphthyridin-2-yl]-1H-4-pyrazolecarbaldehydes using POCl₃-DMF over silica gel under ultrasonically assisted synthesis. The significant advantages of this procedure are: high yields of the products, short reaction times, non-toxicity of the reagent, mild reaction conditions, economic viability, operational simplicity, excellent purity and minimum environmental impact.

ACKNOWLEDGEMENT

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CONFLICT OF INTEREST

Authors have no conflict of interest.

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Formulation & Evaluation of Celecoxib Loaded Microsponges for Chemoprevention of Familial Adenomatous Polyps (Fap)

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ABSTRACT

Objective: The main motto of this study is to develop and assess oral capsules containing celecoxib microsponges for colon targeting in order to treat Familial Adenomatous Polyps (FAP) and prevent the development of cancer.

Materials and Methods: The Celecoxib microsponges were made utilising a quasi-emulsion solvent diffusion method. Eudragit S 100 (polymer), polyvinyl alcohol (emulsifier), and ethanol (co-solvent) were used. The ratios of drug to polymer utilised are 1: 0.25, 1: 0.5, 1: 0.75, 1: 1, and 1: 2. FTIR, optical microscopy, scanning electron microscopy (SEM), percent yield, percent drug content, percent encapsulation efficiency, and in vitro dissolution testing are used to assess the microsponges.

Result: Compatibility studies found that the drug and the excipients employed have no interactions. Varying the drug-polymer concentration has a noticeable change in product yield, drug content, encapsulation efficiency, particle size, and drug release. SEM analysis says that the produced microsponges formulation was extremely porous, indicating their potential for increased drug loading. In vitro dissolution profile revealed that the MF6 formulation was more efficient, releasing 92% of the drug during a 12 h period.

Conclusion: The optimized formulation demonstrated 90 percent drug release in a controlled way over a 12 h period and was found to be an efficient method of formulation to increase drug solubility, hence increasing the drug's bioavailability and providing an advantage over conventional formulations.

Keywords: Microsponges, FAP, Celecoxib, chemoprevention, polyps.

INTRODUCTION

A gastrointestinal (GI) polyp is an abnormal protrusion of tissue from the mucosal layer that can occur anywhere throughout the GI tract. FAP is an autosomal dominant state marked by the formation of loads of adenomas in the colorectal part during the second decade of life^{1,2,3}. COX-II is an inducible mediator of prostaglandin synthesis, the predominant end product of which is PGE2 (prostaglandin 2). PGE2 is a key component in colorectal carcinogenesis. COX inhibitors, both selective (such as celecoxib) and nonspecific (aspirin), can help decrease the chances of colorectal cancer (CRC). It is discovered that over secretion of the cyclooxygenase 2 (COX-2) enzyme is connected with colorectal adenomatous polyps and colorectal cancer leading, researchers to come up with its suppression as a chemopreventive strategy, and celecoxib considerably decreased the incidence of colorectal malignancies^{4,5}.

Microsponge Drug Delivery System (MDS) comes under a patented polymeric formulation comprising porous spherical microspheres that are small sponge-like and composed of an infinite number of linked voids within a non-pliable structure from which the active ingredient is control released through the large porous surface^{6,7,8,9}. The diameter range of microsponges usually exists from 5 to 300 μm . An average sphere whose diameter can be up to 25 μm has 250000 pores approximately resulting in 1 mL/g of total pore volume for extensive withholding of drug^{10, 11, 12}. The Microsponge Systems have microscopic microspheres which are polymer-based that have the ability to entrap a large spectrum of contents which can be consolidated into a gel, cream, liquid, or powder^{13,14,15}. MDS has the potential to significantly enhance the efficiency of topical medicines while also making them safe to use, enhancing product stability, and aesthetic aspects in a cost-effective and unique manner^{16,17,18}.

MATERIALS AND METHODS

Materials: Celecoxib was gifted by Hetero Pharmaceuticals Ltd., Hyderabad; Eudragit S 100 was provided by Evonik India Pvt. Ltd., Mumbai; and polyvinyl alcohol (PVA) was provided by Alpha chemika Laboratory, Mumbai (Qualigens Fine chemicals, Mumbai). Analytical-grade reagents and solvents were utilized.

Quasi Emulsion Solvent Diffusion Method: In this study, microsponges were generated utilizing the above method with drug to polymer ratios of 1:0.25, 1:0.5, 1:0.75, 1:1, and 1:2. At room temperature Celecoxib, Alcohol, and a polymer solution were added to a 0.50 % w/v PVA solution and stirred for 10 h at 500 rpm

speed. The blend was continually stirred, and filtered to remove microsponges. The obtained final product was washed and dried for 12 h in a hot air oven set to a temperature of 40°C.

EVALUATION

Microscopy

Primary characterization of the prepared microsponges was conducted using an optical microscope.

Production Yield

The microsp sponge's production yield was estimated by noting the initial and final weights of raw materials and the microsponges obtained.

$$\text{Production yield(\%)} = \frac{\text{Practical mass of the microsponges}}{\text{Theoretical mass (polymer + drug)}} \times 100$$

Drug Content and Entrapment Efficiency

100 mg of the prepared microsponges were dissolved in 100 mL phosphate buffer of pH 6.8 during an 8 h period with constant stirring. The resultant mixture is poured on to a whattman filter paper, and the filtrate thus obtained was studied spectrophotometrically at 252 nm.

$$\text{Drug content (\%)} = \frac{\text{Actual amount of drug in microsponges}}{\text{Weighed amount of microsponges}} \times 100$$

$$\text{Entrapment efficiency (\%)} = \frac{\text{Actual amount of the drug in microsponges}}{\text{Theoretical amount of drug in microsponges}} \times 100$$

Sem Analysis

The structure of the surface is analysed using SEM. They were sparingly sprinkled over a double-sided adhesive tape that was adhered to an aluminium grooved edge stub to set the samples. The stub is then carefully coated in gold. Scanning electron microscopy was used to photograph the coated samples indiscriminately.

In Vitro Dissolution Studies

Celecoxib was released from microsp sponge using three different buffer solutions as a dissolution media (900 mL): 0.1N HCl, pH 6.8 & 7.4 phosphate buffer solutions. In the basket type, a microsp sponge equivalent to 400 mg of Celecoxib was taken. Throughout the experiment, the following conditions were observed: 100 rpm speed, and 37.0 ± 0.5°C temperature were maintained. At specific predetermined time intervals, aliquots (5 mL) of dissolution media were removed and replaced with new dissolution media. Using a UV- spectrophotometer the drug's concentration was evaluated knowing the absorbance at 252 nm.

Comparison of Dissolution Data: The drug release kinetics were studied by Higuchi diffusion model and the Hixon-Crowell erosion model. Korsmeyer-Peppas support the method of drug release pending further evaluation. Appropriate models for release kinetics and mechanism can be identified by their highest correlation coefficient values in comparison to alternative models. To examine the dissolving behavior of the prepared microsponges, dissolution data were fitted to models.

Table: 1. Composition of Microsp sponge formulations

Ingredients	MF1	MF2	MF3	MF4	MF5	MF6	MF7
Celecoxib (mg)	400	400	400	400	400	400	400
EudragitS100 (mg)	100	200	300	400	800	400	400
PVA (mg)	50	50	50	50	50	60	70
Alcohol: DCM (mL)	5	5	5	5	5	5	5
Distilled water (mL)	100	100	100	100	100	100	100

RESULTS AND DISCUSSION

FT-IR Results: FT-IR was used to investigate the drug-polymer compatibility. Figures 1, 2, 3, and 4 illustrate the FT-IR spectra. The FT-IR analysis of the drug reveals a strong intense stretching link between the sulphonamide group (S=O) at 1030 cm⁻¹, NH₂ stretching at 3340 cm⁻¹, and NH stretching at 1580 cm⁻¹. It is shown that the drug's conspicuous distinctive peaks are retained in the drug sample, physical mixture, and optimized formulation, indicating that there are no interactions influencing the drug's activity. These excipients could be used in combination to do additional research.

Fig: 1 FTIR of drug (Celecoxib)

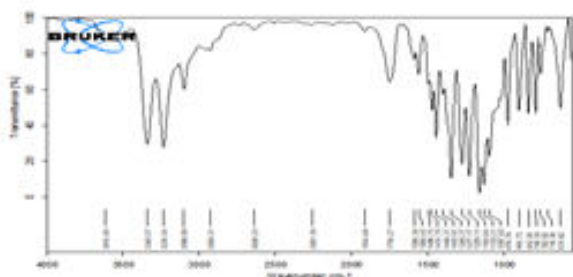


Fig: 2 FTIR of polymer (Eudragit S100)

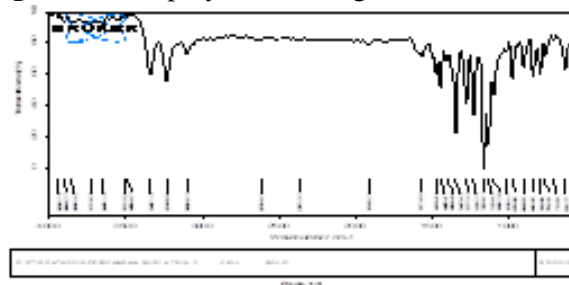


Fig: 3 FTIR of Physical mixtures

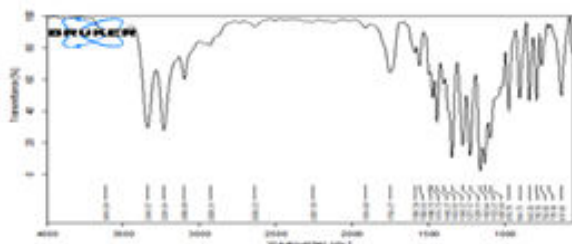
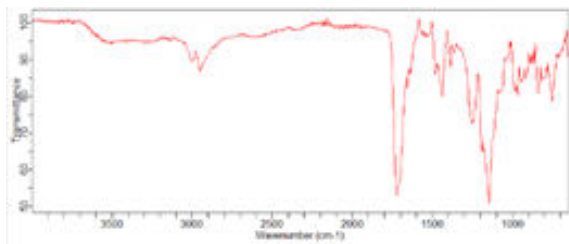


Fig: 4 FTIR of optimized formulation MF6



CALIBRATION CURVE RESULT

Celecoxib was calibrated at 252 nm in this investigation using UV-spectrophotometry. It followed Beer's law between 10 and 60 g/ml. Between absorbance and concentration, a clear correlation was discovered, with correlation coefficients of 0.9828, 0.997, and 0.996, respectively. For 0.1N HCl, the regression equation is $y = 0.006x + 0.171$, for pH 6.8 buffer, $y = 0.013x + 0.007$, and for pH 7.4 buffer, $y = 0.006x + 0.001$, where 'y' is the absorbance and 'x' is the drug concentration in $\mu\text{g/ml}$.

Microscopy: The prepared microsponges were examined using an optical microscope, and the resulting image of the optimized formulation is included below.



Fig: 5 Microscopic image of optimized formulation

Scanning Electron Microscopy (SEM) Studies

The surface structure and topography can be analyzed using SEM. Figure 6,7 illustrates the SEM picture of microsponges at various magnifications. SEM analysis revealed that the microsponges generated were extremely porous. Pores were formed because of solvent diffusion from the surface of microsponges. A normal $25\mu\text{m}$ -diameter sphere can contain up to 25000 pores. Thus, it was discovered that the microsponges created had larger pores, indicating their capacity for increased drug loading.

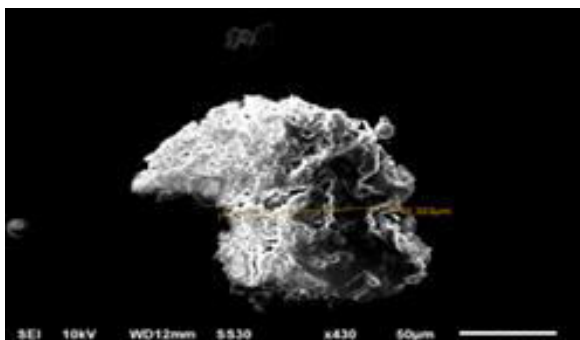


Fig: 6 SEM image of optimized
Microsponge at magnification $50\mu\text{m}$

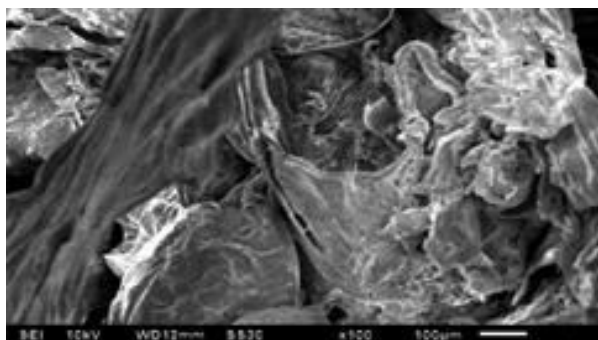


Fig: 7 SEM image of optimized
Microsponge at magnification $100\mu\text{m}$

Percentage Yield (%)

The percent yield values for the microsponges obtained have been determined and are shown in Table 2. It demonstrates that the production yield increases with an increase in drug to polymer ratio.

Percentage Entrapment Efficiency (%)

Values listed in Table 2 reflected that the lower the drug: polymer ratio, the greater the entrapment efficiency and increased internal phase volume, resulting in decreased entrapment efficiency and an increase in PVA concentration. At a high drug: polymer ratio, the dispersed phase had a slightly increased viscosity, and when solvents diffused out, nearly all of the dispersed phase converted to solid microsponges, resulting in a high % EE.

Table 2. Values of %yield, %entrapment efficiency.

Formulation	Production Yield	Theoretical drug content	Actual drug content	EE
	(%± s.d)	(%)	(%± s.d)	(%±s.d)
F1	66±1.25	66	60.72±1.50	92±1.85
F2	78±1.89	78	67.86±2.05	87±2.09
F3	89±1.56	89	72.98±1.98	82±1.95
F4	91±2.05	91	69.16±2.09	76±1.47
F5	95±1.75	95	59.85±1.18	63±2.04
F6	88±0.98	88	69.52±1.52	79±1.21
F7	86±1.45	86	71.38±1.20	83±1.89

Table 3. Effect of external phase (PVA Concentration)

(Mean ±SD, n=3)

In Vitro Dissolution Studies

In vitro dissolution studies were conducted using the USP dissolution test apparatus Type I (basket type), and the dissolution profiles of Celecoxib microsponges are depicted in Figure 8.

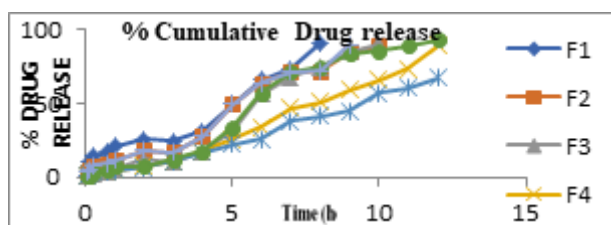


Fig: 8 Dissolution profile of all formulations

Table 4. Dissolution data of prepared microsponges

Time (h)	MF1	MF2	MF3	MF4	MF5	MF6	MF7
0.084	0.937±0.15	3.3±0.12	0.56 ±0.46	0.937 ±0.86	0.9375 ±0.44	0.5625 ±0.69	3.3 ±0.25
0.16	9.680±0.12	4.23 ±0.83	1.57 ±0.81	1.575 ±0.64	1.5759 ±0.58	0.938 ±0.34	4.239 ±0.74
0.25	14.07±0.19	7.80 ±0.89	2.21 ±0.72	3.077 ±0.67	3.0776 ±0.91	3.03 ±0.86	7.80 ±0.82
0.75	16.74±0.25	9.23 ±0.65	3.82 ±0.91	3.942 ±0.72	3.9423 ±0.81	5.06 ±0.81	9.236 ±0.51
1	20.50±0.87	11.4 ±0.87	5.33 ±0.76	4.282 ±0.94	4.2821±0.77	7.02 ±0.54	11.455 ±0.61
2	25.77±0.75	17.9 ±0.75	11.6 ±0.81	7.098 ±0.83	6.8359 ±0.82	7.11 ±0.83	17.91 ±0.63
3	23.98±0.57	16.5 ±0.91	10.2 ±0.84	10.62 ±0.61	10.8 ±0.68	11.97 ±0.72	16.52 ±0.52
4	30.98±0.45	27.4 ±0.81	17.0 ±0.46	17.02 ±0.82	16.452 ±0.61	17.20 ±0.84	27.49 ±0.87
5	48.95±0.86	48.9	31.6	25.67	22.378	33.5	48.95±0.

		±0.82	±0.58	±0.84	±0.82	±0.83	87
6	65.60±0.57	63.3 ±0.86	55.8 ±0.47	33.25 ±0.96	25.265 ±0.34	56.48 ±0.43	63.31±0. 98
7	72.97±0.85	70.6±0.18	67.0±0.25	46.72±0.58	37.913 ±0.61	70.68±0.43	70.68±0. 15
8	90.19±0.68	71.6±0.25	74.104±0.5 8	50.50±0.75	40.823 ±0.58	73.95±0.57	71.66±0. 68
9		84.3±0.74	84.3±0.89	58.29±0.45	44.26 ±0.68	82.77±0.74	88.92±0. 85
10	89.6±0.57	65.1 ±0.75			56.816 ±0.95		85.07±0. 66
11		73.07±0.27			59.624 ±0.68		88.23±0. 73
12		88.13±0.74			66.839 ±0.68		92.26±0. 95

(mean ± s.d., n=3)

Comparison of dissolution data: The kinetics and drug release mechanism are determined using a model-dependent method. The data were fitted using widely used exponential equations, including zero order, first order, Higuchi, Hixon-Crowell, and Peppas, and the kinetics of release for each of the produced formulations are listed in Table 5. Correlation coefficients of determination 'R²' values found for zero order (0.953-0.990) are greater than those obtained for first order (0.921-0.989). All formulations exhibited zero order kinetics of release. The drug release mechanism was further evaluated using the Higuchi and Korsmeyer-Peppas models. The method of drug release was determined to be diffuse, as evidenced by their higher coefficient of determination (R²) values, Korsmeyer-Peppas coefficients (0.958). When the data are subjected to the Peppas model, the 'n' value produced is between 0.08 and 0.30, indicating a fickian diffusion mechanism.

Table: 5. Kinetic data of formulations

(Mean ±SD., n=3)

Drug Release Kinetics of Optimized Formula

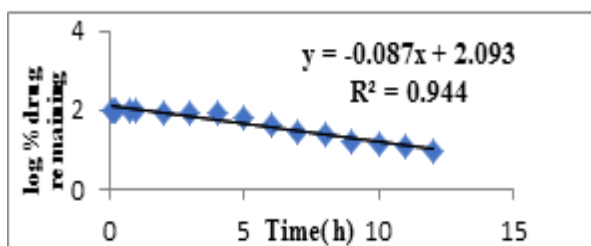


Fig: 9 Drug release profile for MF6

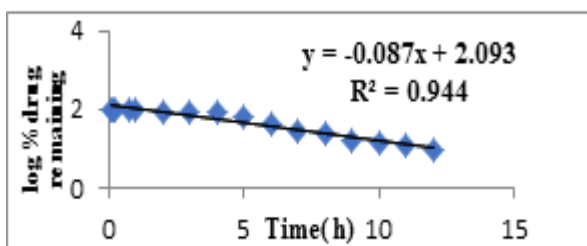


Fig: 10 first order plot for MF6

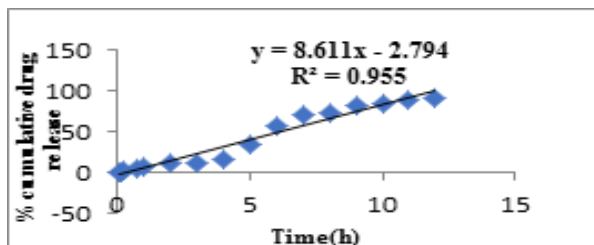


Fig: 11 Zero order plot for MF6

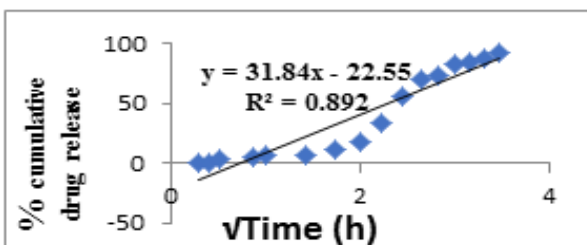


Fig: 12 Higuchi plot for MF6

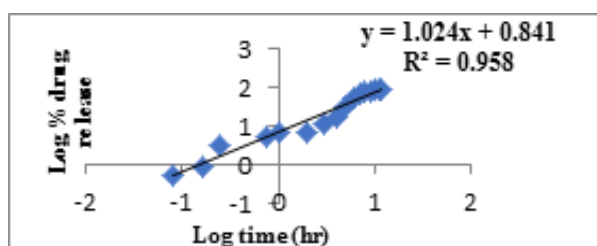


Fig: 13 Peppas plot for optimized formulation

Zero order	$K_0 = 8.61$ (mg/h)	$R^2 = 0.955$	
First order	$K_1 = 0.087$ (h ⁻¹)	$R^2 = 0.944$	
Higuchi		$R^2 = 0.892$	
Korsmeyer-Peppas		$R^2 = 0.958$	n = 1.024

DISCUSSION

The optimized 1:1 ratio was evaluated for the influence of the external phase, which consisted of PVA concentrations of 0.6 % w/v and 0.7 % w/v. FT-IR investigations revealed that there was no drug, excipient interactions. Celecoxib is determined analytically using spectrophotometry; a calibration curve was produced using 0.1N HCl, pH 6.8 & pH 7.4 phosphate buffer, and absorbance at 252 nm was observed. The percent yield value, entrapment efficiency, and *in vitro* drug release of the produced microsponges were determined. The percent yield values vary between 66 and 95 %, whereas the percent entrapment efficiency values range between 63 and 92 %. At higher polymer concentrations and median exterior phase volumes, higher yield and entrapment efficiency values are found. Dissolution experiments indicate that 92 % drug was released in 12 h in all the formulations when used in a 1:1 drug ratio with a 0.6 % w/v concentration of external phase volume.

CONCLUSION

Microsponges of Celecoxib were prepared in this study using a quasi-emulsion solvent diffusion approach, which resulted in stable and porous microsponges. Seven formulations with varying drug to polymer concentrations and exterior phase volumes were studied for Celecoxib microsponges optimization using the following evaluation parameters: percent yield, percent entrapment efficiency, and percent drug release. MF4 was the optimal formulation from which the MF6 and MF7 formulations were created by adjusting the amount of PVA in the exterior phase. It established that the MF6 formulation was the most optimal of the three. The improved formulation was created and demonstrated regulated drug release of 90% for 12 h. Thus, I can conclude from this work that the microsponges' drug delivery system can be employed as an efficient method to increase the drug solubility, thereby increasing the drug's bioavailability and providing an extended-release profile that is advantageous over standard formulations.

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A Study on Cyber Security: Understanding Its Impact on Business Sustainability

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ABSTRACT

Sustainability has progressively become necessary to business over the past decades as a result of the speedy depletion of natural resources and issues over wealth inequalities. Cyber risk is the instantaneous and capitalistically material sustainability risk that institutions face today. The organizations that fail to devise good governance on cyber security, utilizing appropriate tools and metrics, will be less resilient and less sustainable. Sustainability principles can help cyber security programs also, assuring them each of two, more effective in terms of long-term cyber-risk mitigation and more responsible in terms of community impact. The present paper highlights the scenario of digital business and ways of cyber security, as every business is vulnerable and target to cyber threats and malicious softwares.

Keywords: Cyber Security, Sustainability, Cyber Risk, Cloud Computing, Threat

INTRODUCTION

Over the last decade availability and reliance on cloud computing services is increased and which helps in providing a strategic dynamic capability for firms to scale up or down its infrastructure. A cloud computing infrastructure enables on-demand network access to a shared pool of configurable computing resources.(Bharadwaj et al, 2013). Historically, cloud computing has been regarded as a privilege of IT functions (CIOs), but increasingly now it also supports supply chains, marketing and service operations, and other functional areas. (e.g., Buyya et al. 2007). That is why Cyber security has become necessary and essential for any business to sustain.

What is Cyber Security?

Cyber security is a set of tools, policies, security concepts, security safeguards, guidelines, risk management techniques, activities, training, best practices, assurance, and technology that can be used to safeguard the cyber environment, and also organization's and users' assets. Linked computing devices, staff, infrastructure, applications, services, telecommunications systems, and the totality of transmitted and/or stored information in the cyber environment are all assets of company and users. Cyber security aims to protect an organization's and its users' assets from relevant cyber security dangers by achieving and maintaining their security properties.(The International Telecommunications Union)

Cyber Security — A Business Perspective

Security is one of the important matters discussed in boardroom for any business. The investment done by companies on security is also quite huge. In fact, IBM has estimated that the average financial cost of a data breach is over \$3.8 million, but for Institutes with at least a thousand employees, that value might be 10x or even 100x higher.

For organizations to work safely within the contemporary threat landscape, they have to make sure they are consistently evaluating the effectiveness of their defenses to be as secure as possible. At the same time, they have to make sure that they are utilizing the foremost modern solutions and have the proper expertise at hand.

Why Sustainable Cyber Security Practices Matter?

Infact Cybercrimes, have increased during the 2020 pandemic, with the National Security Advisor reporting a rise of ~500% in cases. (Arya Adarsha Gautam 2021). Karnataka and Uttar Pradesh accounted for the highest share during the measured time period.(statista.com)

Sixty-eight percent of CEOs believe their cyber security threats are rising.(Accenture) To put a restriction on to such activities, the government is also now taking efforts to mitigate the impact of cyber threat, it would spend 515 crore rupees on cyber security in 2022-23 In comparison to 2014-2015, this is a tenfold rise. Sustainable cyber security practices carry technical, financial, regulatory, social and reputational drivers and benefits.

Reasons for Adopting Cyber Security Practices in Business

1. Better Cyber Outcomes

An unsustainable cyber security strategy will reach a degree of diminishing returns when it becomes less and fewer effective at mitigating risk

In order to secure this, sustainable cyber security practitioners think strategically and in a wider term when making major architectural decisions:

Unsustainable: Absorbing digital transformation and visiting the cloud without a transparent security plan

Sustainable: Instituting a long-lasting strategy for managing cross-cloud security activity and ensuring all new partners and providers fit into that strategy.

2. Cost Control

Practitioners of sustainable cyber security proactively set goals and priorities at the beginning of the year to deal with their biggest vulnerabilities. They see related expenses, which they build into budget planning, as important investments within the overall health of their organizations

Unsustainable: Repeatedly paying ransom ware fees to unlock files because nobody made a business continuity plan.

Sustainable: Implementing endpoint detection and response, building a 3-2-1 backup strategy and establishing -- and practicing -- an event response plan and other standard operating procedures.

Security Threats in Business

Technology is evolving at a rapid pace. In the financial year 2021, over 3.8 thousand government services in India were provided over the internet.(Statista) New styles of devices are evolving at shorter intervals. Technologies like Cloud Computing are aggressively scaling up. These new technologies and devices, need protection from cybercriminals, but for securing technologies every business needs a powerful shield of cyber security measures, which will help them, defend against growing concerns of a cyber-attack and its consequences.

Businesses of every size and form are experiencing the threatening remark of cybercrime. Because of the web, businesses are using digital technology at every step of their way, from sending and receiving emails, networking and collaboration, real-time work, financial transactions, etc (According to a CLSA report, the value of digital payments in India will nearly triple from \$300 billion in FY21 to over \$1 trillion in FY26)

Any cyber-attack could tarnish the reputation of the firm because of the potential loss of the sensitive data of its customers.

But what could actually make this happen?

Following below are some of the examples

1. Not Having Adequate Awareness is One of the Most Important Reasons

Businesses must be proactive in cyber security or in turning away a cyber threat. As per the study the reluctances in the area of cyber security is the number one reason for the increase in cyber threats. It is believed that everyday 30,000 websites are hacked. In reality, every 39 seconds, a company is hit by a cyber attack, and some type of malware has hit more than 60% of businesses worldwide. (Techjury,2022)

The pandemic has forced businesses to be remote, and thus, it increased the adoption of internet services across the sectors. There were 5,168,780,607 internet users in 2021.

<https://www.internetworldstats.com/stats.htm>

Businesses are now more dependent on web uses than before. It is a growing concern if they are not equipped with the correct insight or information.

Awareness is the only key because cyber criminals have become smart and increasingly using complex, advanced tools to induce their job. Lack of digital security awareness leads customers to play an element in compromising business security or individual privacy. If it has to be prevented, businesses have to step in by making regular awareness drives and keeping the workers informed about the ways and methods that hackers deploy to trap.

Hackers can send legit-looking emails that will persuade you to convey your sensitive credentials or use pop-ups to entice you to click. Or will use emails to prompt you to download attachments that are useful for your work, this will help them to get your credentials and use that to send business emails, conduct financial transactions, steal sensitive information, and conceal within the system for a protracted time. Every day in 2020, around 306 billion e-mails were sent and received globally. In 2025, this number is expected to rise to over 376 billion daily e-mails. (statista.com)

2. Data Leak Protection

Data Leak protection is one more area of attention to secure the privacy and security of customers. Businesses house stock all of their data ranging from customer data, business data, and other sensitive information, which could be at potential risk of theft if hackers gain ingress to any of the important employee credentials. Around 19.18 million Indian users' data was leaked in 2020. (Business today. in)

Amongst many suggested ways to safeguard data from leaking is to use burner emails. These burner emails are nothing but dummy emails of institutions that they use to sign in to various websites that they don't prefer to give their complete credentials. You can also use many tools, which will assist you ensure the maximum security of your data.

3. Ransom Ware-Attacks are on the Rise

Ransom ware attacks are increasing lately. Hackers used the vulnerability of COVID-19 to workplaces worldwide to launch their attack Due to social distancing policies; most employees were forced to work remotely, away from company firewalls. Ransom ware attacks increased by 92.7 percent in 2021 over 2020, with 1,389 assaults recorded in 2020 and 2,690 in 2021. (securitymagazine.com)

Ransom ware attacks are also increasing because a substantial number of businesses are using the cloud to store their sensitive data. As of 2022, about 60% of all corporate data is stored on cloud. (Lionel Sujay Vailshery, May 2022)

Many believe the cloud to be much safer than physical storage devices. The fact is the cloud has made it more sensitive. However, cloud service providers are making it their mission to install their cyber security force to prevent any such attack in businesses, as it can stain their reputation and lose numerous business clients over trust and reliability issues, which will seriously hurt their business.

Consequences like these are why experts recommend that every software be regularly updated to patch any loophole that might give way to ransom ware entering into the system. Businesses also need to invest in detecting this malware to own the edge over cyber criminals.

Measures that can be adapted to Secure Business from Threat of Cyber Security

There are a few simple steps your business can take to protect itself from cybercrime, below are a few examples:

1. Educate Your Human Resource

Cyber security training is a strategy adopted by the IT and Security professionals in an institute to turn aside and reduce risk when it comes to compromising an organization's information security. These training programs are particularly designed to provide employees with clarity regarding their roles and responsibilities when it comes to upholding information security. A fortunate security awareness program, assist employees understand proper cyber etiquette, the security risks associated with their actions and to recognize cyber attacks they may encounter during their day to day operations.

2. Adoption of Prerogative Access

Using Privileged Access Management, strategies and technologies organizations handle the privileged access and authorization for users, accounts, processes, and systems across an IT environment. By strategically assigning employees the right level of access based on their role and responsibilities in the organization, the risk of suffering extensive damage from a cyber attack is effectively reduced, irrespective of whether it is from an external actor or due to internal errors.

3. Monitoring, Detection & Response

Businesses are required to scan the systems and networks on a 24/7 basis to warrant that there is no dubious activity that may point to an attack or breach. If cyber security monitoring is not in place this could lead to a delay in spotting that an attack is underway and your business may not be able to respond in time to prevent it or mitigate its impact.

4. Manage Third-Party Risk

Third-Party Risk refers to the prospective threat bestowed to a business's employees and customer data, financial information and operations, from third-party vendors e.g. suppliers and other outside parties that furnish products and/or services and have ingress to your systems. It is crucial for businesses to do their due diligence while collaborating with a vendor e.g. ensuring that they have required information security policies in place and to continue to monitor that these standards are upheld when handling their valuable data.

All these are just examples of initiatives, which businesses can adopt to mitigate the impact of cyber threat and can defend themselves from falling prey to cybercrime.

CONCLUSION

Cyber security is an endless battle; threats will evolve as adversaries undertake new gear and strategies to compromise security. Cyber security is consequently an ongoing method that desires to conform as new threats are identified. Numerous benefits come with investing in cyber security. It is pivotal for companies to reinforce their IT infrastructures by investing in cyber security solutions to ensure that their systems are resilient enough to combat any cyber threat. For achieving business sustainability preventing and handling of cyber security risk is very essential. In order to effectively be part of the solution to cyber risks, it is imperative that organizations make extensive vulnerability or weakness analysis mandatory (Savaglia & Wang, 2017).

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Start-Up Funding and Sustainability Challenges Evolve: PostPandemic Perspective

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ABSTRACT

In recent years the self-employment consciousness among college student is increasing and the students are less likely to rely on parents or schools or wait for opportunities. Instead, they tend to take initiative to look for new chances for themselves. The pandemic further made many youngsters jobless and forced entrepreneurial startups.

India is the seventh-largest country by area and the second-most populous country with over 1.32 billion people. Large population implies a large potential market in India. However, it also leads to heavy employment pressure in Indian society. Thus the entrepreneurial skills will be the future of India. But there are many challenges being most populace country.

This research aims to investigate the challenges of financing startups in India. The paper explores the sustainable difficulties faced by startups in India, and discusses the financing resources of startups in India.

Keywords: self-employment, entrepreneurial skills, startup funding, etc.

1. INTRODUCTION

As it is a known fact that when someone starts a new enterprise or tries to get into entrepreneurship they face many problems like finance, land permissions, environmental clearance, foreign investment proposals, family support etc. Startups depend on investors or venture capital firms that take a big risk and invest in these new companies that show the potential of growth while small businesses are financed by loan or grant from banks. This is in fact an advantage that a startup has over a small business, since the investors have taken a greater risk in funding the startups, they keep a regular check on them to see the progress and offer them ideas for further growth.

One of the main advantages of start-up is that it creates new job. Small and medium businesses are the backbone of India's economy, employing 100 million people and contributing to a 3rd India's GDP. These numbers are likely to increase in future. Earlier India was known as agricultural country but in future it will be known as country of start-ups. Start-up provides the solution to social and economic issues. In future there will be many start-ups which will help in making India economically and socially developed country. Start-up provides the solution to social and economic issues.

2. LITERATURE REVIEW

Badra, Shailja, Dr. and Sharma, Vivek in their research paper title "Start-up India- New Opportunities for The Entrepreneur" (2016) writes, the success of Start-up India campaign hinges on initiatives like faster and easier registration of Companies, self-certification for many legal requirements, zero inspection for three years, funding for patents, and speed of patent protection.

Report title "Start-Up India- an Overview" Prepared by Grant Thornton for ASSOCHAM India (2016) writes "Startups have been the flavor of the season over the last few years for the Indian markets. This has resulted into the emergence of a number of home grown unicorns across the country.

Sharifi Omidand Hossein, Karbalaei, Bentolhoda. In their research paper title "Understanding The Financing Challenges Faced By Start-ups In India" (2015) explains Funding is a major concern for startups and small businesses. When the economy tanked, it made it harder to convince investors and banks alike to part with the cash that is essential for growth in the early days of a business.

Andaleeb, Uruba and Singh, S.D,Dr. In their research paper title "A study of Financing Sources for Start-up Companies in India"(2016) explains, aiming to foster entrepreneurship and promoting innovation by providing an ecosystem that is conducive for growth of Start-ups, withan object to facilitate India become a nation of job creators instead of being a nation of job seekers.

3. OBJECTIVES OF THE STUDY

3.1 To study growth of startups.

3.2 To find out various government schemes/ supports funding startups

3.3 To find challenges faced by startups for raising funds.

3.4 To give suitable recommendation.

4. SCOPE OF THE STUDY

India is the third largest hub; having 50,000 start-ups approximately. More than 800 startups are being established annually. Present research is being conducted in order to study various modes of start-up financing and the challenges involved during it.

5. RESEARCH METHODOLOGY

This report is based on primary as well as secondary data. Primary data is given more importance in order to achieve better accuracy; data was collected through interview/survey method from the sample size of 300 respondents (Businessmen, Entrepreneurs) of Mumbai suburbs.

Secondary data collected through various books, journal and internet available data.

6. FINDINGS

In a country where there is way more people than jobs, there is nothing more important than creating employment opportunities. In the past couple of years, the 'startup culture', as it is popularly called, has indeed gained momentum, as more and more people are choosing to startup their own SMEs.

6.1 Indian Startup Evolution

Years 2005-10 showed immense growth in a number of startup stories that have made an unmatched space across the globe. Here they are:

6.1.1 Freshdesk: Founded in 2010 by Girish Mathrubhootam and Shan Krishnaswamy, the venture in no time gained the attention of some of the leading VCs in India. Being formerly started in a small room, today it has space at one of the swankiest lanes of Chennai, IT Highway.

6.1.2 Zoho: Sridhar Vembu founded Zoho Corporation, and despite being a co-founder of the Zoho office suite lately, he is largely known and recognized for building the multi-million dollar Zoho Corporation from scratch. Needless to say, Zoho is competing flawlessly with tech giants like Oracle, Microsoft, and Google etc.

6.1.3 PolicyBazaar: Completing a decade of success, the team PolicyBazaar recently organized an event named 'UnBeat10' to celebrate their success with previous and current employees. Also, the company announced that it'll be generating 2500 more jobs in the FY 2019 and has shown 100% YoY growth.

6.1.4 Flipkart: Another startup to complete a decade this year, Flipkart needs no distinct introduction. The Indian eCommerce giant got recently acquired by Walmart for \$16 billion. Being started by Sachin and Binny Bansal in the year 2007, the company showed remarkable growth by delivering 3,400 products successfully.

7.1.4 Zomato: Started in 2008, the restaurant search and discovery app have in and out information of more than one million restaurants located in 23 countries across the globe. Though initially, it started under the name of Foodiebay.com, within just two years, it didn't just transform its name but the entire online world of foodies.

6.2 Collective Efforts by Government and Agencies to Boost Startups

Roll back to 2013 where the National Association of Software and Services Companies (NASSCOM) kicked off its '10,000 Startups' initiative. The aim was to aid the growth of 10,000 startups in the country over the next 10 years. The objective was to foster the startup ecosystem, build entrepreneurial capabilities and bring in considerable value and change in the tech startup ecosystem. All this was made under the F.A.M.E. model:

6.2.1 Funding: The shortlisted startups were given assistance from the NASSCOM. 10,000 Startups were selected under this programme where NASSCOM helped them raise money from a wide range of investors. This includes procuring funding angels, VCs, micro VCs, and Government funds.

6.2.2 Acceleration: Once shortlisted under this program, these startups begin working with the top accelerators. This NASSCOM 10,000 Startups programme offers exceptional prospects and an ideal way towards working all the way up to top accelerators.

6.2.3 Mentoring: Another important aspect of here is to avail the focused group workshops specially designed for the shortlisted companies. The workshops were conducted on Product Management, Go-to-Market Strategy, Pitching and Industry Insights from the experts.

6.2.4 Enterprise Connect: Here's when the selected startups will get the opportunity to display and explain their offerings in front of the top executives across industries. The idea is to let these set of startup explore strategic alliances, partnerships, M&As.

While on one hand supportive ecosystem and agencies like NASSCOM, CII, TIE, with others played a crucial role, on the other hand, micro level ecosystem players, incubators, friendly startup policies, government's motivation, and others commendably added the blend.

In August 2015, Narendra Modi announced the "Standup India" campaign to aid startups in getting the bank funding and thereby encouraging young Indians to take up the entrepreneurial route. It is important to note that he also urged all the 1.25 lakh bank branches across India to fund at least one startup especially founded by tribal and Dalit individuals.

Another bold event saw in January 2016 saw Union Cabinet approving the Standup India campaign aimed towards promoting entrepreneurship among women and scheduled castes and tribes. Few of the scheme highlights are:

- Providing loans for greenfield projects in the non-farm sector
- One bank branch facilitating at least one such project

6.3 Schemes for Start-ups in India

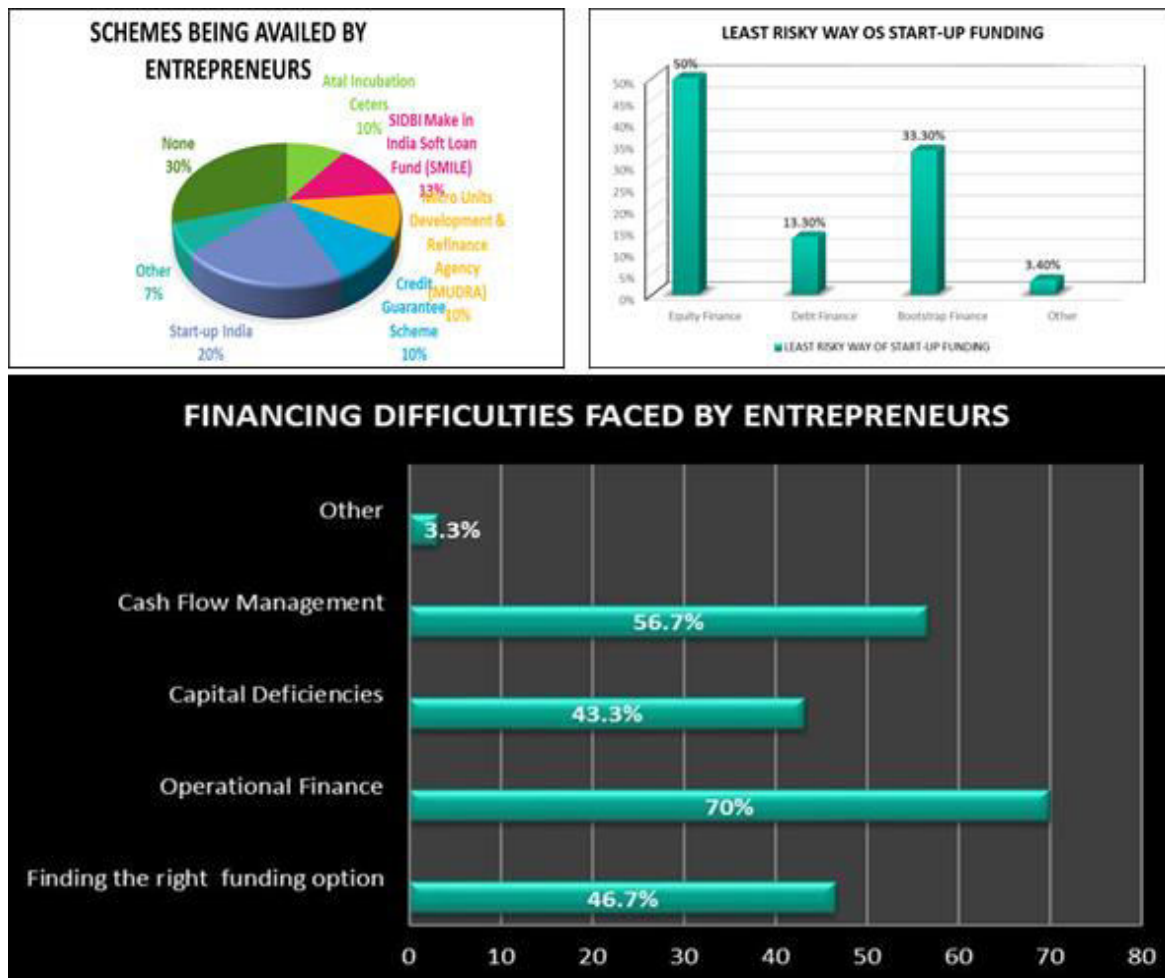
Needless to say, the government is all for it, and has launched a variety of startup schemes and loans to encourage more and more people to start their own businesses. Although there are tons of schemes available, here's looking at 10 of the most viable startup schemes.

- 6.3.1 MUDRA** – The Micro Units Development and Refinance Agency or MUDRA, is a flagship program by the government of India to provide funds to micro and small enterprises. What sets MUDRA apart from other loan schemes is the fact that no collateral is required to avail this loan. It is applicable for manufacturing, trading, and even allied agricultural services. It has 3 modules, Shishu (loan up to 50,000), Kishor (Loan between 50,000 and 5 lakh) and Tarun (Loan between 5 lakh and 10 lakh).
- 6.3.2 NABARD** – With schemes for food processing plants and integrated rural development, NABARD works in conjunction with the RBI to implement and regulate financial assistance in rural areas. Its Dairy Entrepreneurship Development scheme offers up to 90% of the project cost (minimum 10 lakhs to maximum 150 lakhs) to budding entrepreneurs.]
- 6.3.3 Credit Guarantee Scheme** – The CGTMSE (Credit Guarantee Fund Trust for Micro and Small Enterprises) was set up by the Government of India to provide business loans to micro and small industries, with zero collateral. This means that new and upcoming startups can avail loans at highly subsidised interest rates without providing any security. Working along with SIDBI (Small Industries Development Bank of India), the government provides a maximum amount of up to 100 lakhs under this scheme.
- 6.3.4 Stand Up India Scheme** – Launched in 2016, this scheme was implemented to cater to women entrepreneurs, as well as those from SC and ST communities. Ranging from 10 lakh to 100 lakh, it is available for Greenfield ventures in manufacturing, trading, and service units.
- 6.3.5 NewGen IEDC** – Introduced last year, the NewGen Innovation and Entrepreneurship Development Centre, provides a one-time non-recurring loan of upto 25 lakhs to finance startup units.
- 6.3.6 AIC** – Headed by the Atal Innovation Mission, the Atal Incubation Centres provide grant-in-aid of Rs. 10 Cr to every AIC. The duration of the grant is a maximum of 5 years. Set up under the NITI aayog, the purpose of AICs will be to provide financial aid and infrastructure assistance to different startups
- 6.3.7 CLCSS** – Under MSME, the Credit Linked Capital Subsidy Scheme is a means to provide subsidy to manufacturing SSI unit which has upgraded its machinery can apply for a 15% subsidy on a loan amount of up to 1 Cr.
- 6.3.8 SMILE** – The SIDBI Make in India Soft Loan Fund for Micro, Small, and Medium Enterprises provides soft loans to MSME units, the amount disbursed varies on the category the unit falls under, with 10% or a maximum of 20 lakhs for General category, and 15% or a maximum of 30 lakhs for SC/ST, PwD, and women.
- 6.3.9 Loan for Rooftop Solar PV Power Projects** – Headed by the Indian Renewable Energy Development Agency (IREDA), this scheme promotes renewable energy development, provide 70% of the project cost, while the entrepreneur will contribute the remaining 30% of the amount

6.3.10 M-SIPS – The Modified Special Incentive Package Scheme provides capital subsidies to manufacturing and electronic units in sectors of technology hardware, etc.

6.4 RESULTS AND DISCUSSION

6.4.1 Survey analysis – According to the survey it can be seen more the 30% of entrepreneurs are ignorant about any scheme or not availing it.



The next part focuses on determining the least risky method of startup funding; It was shown that half of the population believes equity financing is the least risky kind of start-up funding. While investigate financing difficulties it can be comprehended that majority of the people face issue of operational finance.

6.4.2 Hypothesis Formulation & Analysis–

Alternate:	There is relationship between age and availing the Start-ups schemes.
Null:	There is no relationship between age and availing the Start-ups schemes.
	<p>Analysis:</p> <p>The P-value is the chance that a two-degree-of-freedom chi-square statistic is more extreme than 16.2. We reject the null hypothesis and accept the alternate hypothesis since the P-value (0.588) is stronger than the significance level (0.05). It was evident that young people prefer availing the Start-ups schemes.</p>

7. FINANCING DIFFICULTIES FOR SMES IN INDIA

7.1 The small and medium size enterprise does not have a clear picture of property rights, which can easily hinder the corporate financing.

7.2 The small and medium sized enterprise usually has a low credit performance and weaker credit concept and do not have credit rating as high in India as compared to other countries. Data indicates that, in India, more than 50% enterprise have financials with poor management, these enterprises do go for tax evasion, which is resulting in the huge loss of credit funds and added damage to the credit level.

- 8.3. Poor ability to avoid risk and slow development. Compared with some large enterprises, the ability to dodge risk of nearly all the small and medium sized enterprises is noted to be significantly weaker under the situation of asymmetric information, cash supply tension, and into a vicious circle.
- 8.4. Limited guarantee agencies are a reason for mortgage difficulty. In terms of assurance, many guarantee agencies implement membership system, where small and medium sized enterprises are required to pay some security to become the member of the agency.
- 8.5. The warranty processes are quite tiresome, and asset registration fee, guarantee fee, valuation fee are very high for them, which adds to the financial load and lead to failure to get any guarantee for small and medium sized enterprises.
- 8.6. Limited amount of profits tend to make banks unwilling to lend to the small and medium-sized enterprises. In some cases loan taken from the bank is very small amount, but frequency is high also they do have internal problems, which makes the amount that bank loans to them have problems in following, supervision and mortgage security maintenance
- 8.7. The capital market as well as the private financial institutions develops slowly. At current the major source of funds is its own addition. Since the official financial system is unable to encounter the financing requirements of small and medium-sized enterprises.
- 8.8. Operational Finance difficulties- Most startups are self/family funded with limited workforce who makes it difficult to maintain records both financial and operational. Flawed business models and lack of innovative revenue strategies have led to the failure of many startups and they are forced to shut down operations.
- 8.9. Capital and access to capital has been a perennial problem for startups. Despite having raised good investments, startups struggle to survive the competition. Startups are unable to mitigate the gap between burn rate and revenue.
- 8.10. Effective cash management, Gap between burn rate and revenue: Given rising competition from peers both from big as well as small, it becomes imperative for startups to scale up the business and require external funding for the sustainability/growth in the market.
- 8.11. Stringent Eligibility criteria for Tax Exemption
- 8.12. Collateral for Bootstrap Finance- The most noticeable disadvantage of doing bootstrap financing is that it functions without cash funded from any outsiders or lenders. According to SBA (Small Business Administration), nearly 33% of all the recently set up companies that gamble with bootstrap financing stumble.

8. RECOMMENDATIONS

- 8.1 In our survey we found out that majority of start-ups are in beta stage of their track, which means need for startups are required to be promoted on large scale.
- 8.2 People who are looking forward to have their start-ups should be made aware of various government schemes that are available as per their choice of sector.
- 8.3 Government should also look at the grass root level if these schemes & subsidy offered are benefitted or not.
- 8.4 Assistance for finding right financing option should be made easier with proper support so that more people can opt for start-ups.
- 8.5 Training Programmes should be regularly conducted to assist small and medium enterprises to maintain clean and attractive financial record.
- 8.6 Liquidity and the cash flow management is a crucial for any kind of borrowings, hence proper guidance for the same may improvise the borrowing capacity.
- 8.7 Educating and preparing small and medium enterprises for the timely payment of the borrowed funding and to improvise the self credit rating.
- 8.8 Leveraged taxation scheme and ease norms for incubation funding would be necessary for the startups to survive.

9. CONCLUSIONS

From the above study we can conclude that startups have many options to pick from the list of funding methods, from local government to international banks and also equity, debt and bootstrap finance. The criterion to select a method of funding totally depends on the comfort level of an entrepreneur or board of members.

We can also conclude that start-ups prefer equity financing over other ways of funding as it is least risky way of financing. Here we can see that tenure in the market also affects the decision of financing. Challenges faced by startups are mostly internal and at the initial stages which they can overcome but will be a time consuming task, with the boost from government and also with involvement of foreign players in the system, financing for startups is getting a bit easier and India being a developing nation provides a lot of opportunities to all the wannabe entrepreneurs with more positives than challenges in the startup ecosystem in India.

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A Study on the Financial and Marketing Awareness among Women Entrepreneurs with Reference to Thane District

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ABSTRACT

Entrepreneurship is a fast growing concern in today's competitive economy, and its economic value is widely acknowledged. However, it's worth noting that in India, it's commonly regarded as a male-gendered idea. And women who are just starting out in business must deal with some growing pains. Women's entrepreneurship is thought to be an effective tool for women's economic emancipation. For decades, women in India were economically underdeveloped. Only recently has the concept of women entrepreneurship gained traction. Despite the government of India's numerous efforts and incentives, the number of women entrepreneurs in India continues to decline. Women have traditionally been overlooked when it comes to making money and managing finances. They were not even educated properly. Even educated people are discovered to be financially illiterate. Awareness relating to various domains and its correlation with growth of entrepreneurial project is the main highlight of this paper.

Keywords: Women Entrepreneurs, Awareness, Marketing, Finance

INTRODUCTION

During the last few years, planners, policymakers, and social scientists in India and abroad have paid close attention to the concerns of entrepreneurship and female entrepreneurship. Entrepreneurship is regarded as critical to a country's economic progress. Entrepreneurship growth not only benefits an economy by increasing job possibilities and household income, but it also serves as a strategy for reducing the concentration of economic power in the hands of a few. Entrepreneurship is a critical component of the industrialization process, and entrepreneurs play a crucial role in the creation of a modern, innovative society. India has always been a male-dominated country. However, time is passing. Women in India have been offended by the fact that women have been obeying men's dictates for hundreds of years. They now understand their rights and responsibilities, and because to increased understanding among women, they are now on par with men. In every field, they are walking at the same rate as the men. Women, according to this latest trend, are no less or backward than males. Many women have built their own economies, or entrepreneurial empires, and are now dominating their world as they desire. With increasing sensitivity to the position and economics of women, their hidden entrepreneurial potential has increasingly changed.

Therefore, main aim of the research was to study about the Marketing and financial awareness among women entrepreneurs (i.e. women running their own businesses).

STATEMENT OF THE PROBLEM

Women's employment opportunities in agriculture and industry were steadily reduced as the economy became more commercialised and modernised, allowing them to augment their family's income. As a result, a group of metropolitan women has arisen as potential business owners. Women entrepreneurs are the result of not only their own objectives, but also those of their family, friends, and relatives. Certain compulsions can also push them to take on entrepreneurial roles. It might be assumed that the low-income group values both earning money and supplementing income equally, but the number of women who are capable to generate income should increase for a country to transform itself as a developed one. But globally, though women constitute two third of the burden of the world's work, only one tenth of the income is received by them. This happens because of a patriarchal society where Men predominate over women in every sphere of life, particularly in the economic life. Usually decision making on resources, and utilization of her earnings are handled by their male counterparts since majority of the women are not aware about financial matters and about financial products and services. Due to a lack of suitable employment opportunities, non-flexibility of working hours, mobility restrictions, and a desire for economic and social independence, more and more women have turned to business and industry for newer avenues of income generation and self-expression, particularly in the last decade. But women need to be sufficiently financially aware to take effective financial decisions for the proper utilization of household resources and for proeconomic involvement for better lives for the present generations as well as for the future generations. Women are the ones responsible for transmitting financial habits to the future

generations too. Hence, financial literacy among women is very important. Financial literacy is not a requirement which is needed to improve women's management of their personal and household finances alone, but it aims to empower women to equip them to be able to select and have proper access to appropriate financial services and products, as well as to develop and manage their economic activities.

SIGNIFICANCE OF THE STUDY

It's evident that the knowledge, awareness and insight into marketing, financial, human resource, production domain matters a lot for the successful and viable project. Women entrepreneurs tend to grow if they are well aware and updated with the pulse of market. The operational, technical viability of any project depends upon how successfully one can manage the knowledge. So the women entrepreneurs must be trained enough to gauge that knowledge for the benefit of their organization. The study reflects and highlights the need of correlation between the awareness and success of their organization.

LITERATURE REVIEW

According to a research published from George Washington University, around the globe women lag behind men in their levels of financial literacy. Challenge is to overcome from this gender gap by solving all issues connected with finance.

Financial education is about learning of matters connected with finances and the financial environment through a course of study. Scope of financial education has grown wide. Financial education is all about financial literacy, financial expectations, and satisfaction in matters connected with finance. (Hira & Loibl, 2005).

Emira Kozarevic et al. (2016) is of the opinion that financial knowledge of the management plays an important role in their ability to take important financial decisions. The lack of financial knowledge is poised as a cause for the global financial crisis. Large variety of financial products and services are available today for both individuals and the establishments making it complex to take informed financial decisions. Quality of decisions taken by businesses will depend on a large extent on the knowledge level of the decision makers. It has been pointed out by the authors that financial literacy could be one of the key factors promoting economic growth, as decisions taken by management knowingly or unknowingly will directly affect the profitability of the businesses, and, ultimately the overall economy of the society to which the business houses belongs.

According to Ms Gurveen Kaur et al (2017), many women in both urban and rural India have been unable to realise their entrepreneurial goals due to a lack of adequate banking facilities as a result of inadequate financial inclusion and unawareness on the part of women. The author believes that achieving the goal of financial inclusion for women entrepreneurs can also help the country's socioeconomic development. However, adapting financial services to the changing demands of women entrepreneurs and informing them about newly created goods and services is critical to the expansion of financial inclusion programmes.

Surti and Sarupriya (2009) looked into the psychological aspects that affect women entrepreneurs and related awareness in their study. They looked at the influence of stress in women's lives, as well as the impact of demographic factors including marital status and family types. Stress results showed that single women were less stressed than married women. Women in joint families tended to have less role stress than women in nuclear families, owing to the fact that they were more likely to share their difficulties with other family members.

Kamalakaran (2010) in his issue explained the role of financial institutions in development of women entrepreneurs. The problems of women entrepreneurs are listed. He suggested, to solve the problem of finance loan by the financial institutions, commercial banks and non-government organisations engaged in financing and promoting entrepreneurship among women.

Deka, Phani and Baruah (2012) in their study - Challenges and Expectations: A Study in North- establish that women are as much endowed with Entrepreneurial talents as men, admitting in the same breath that the number of women engaged in self-employment is very low. The major challenges before women entrepreneurs as revealed by the authors, relate to assumed responsibilities or perception about their families and self. They feel they are mainly responsible for all kinds of household work. Even in states such as 35 Meghalaya where society is matriarchal, or in Manipur where the majority of petty trade and commerce is in the hands of women, they still behave like dependents on their counterparts.

Nigam Shalini (2013) did research to better understand the characteristics of female entrepreneurs and to determine the various aspects that influence their commercial environment. The desire to be their own boss, achieve financial stability by working extra hours, and obtain fame, recognition, and respect in society were all

major motivators. The vast majority lacked male assistance and received no training. The lack of guidance agencies, aggressive promotion and advertising by larger enterprises, disrupted family life, difficulty in funding the business, and poor government help were all issues.

OBJECTIVES OF THE STUDY

1. To identify the level of awareness among women entrepreneurs.
2. To identify if there are any educational differences in awareness of women relating to different factors.
3. To highlight different factors of marketing and financial knowledge
4. To analyse the different profiles of women entrepreneurs.

HYPOTHESES OF THE STUDY ARE

H0: There is no association between level of awareness and age group of women entrepreneurs.

H0: There is no Educational difference in awareness of women relating to business factors

RESEARCH METHODOLOGY

Primary and secondary data were used during the analysis. Primary data were collected through interview schedule. 65 sample respondents are used for the study based on simple random sampling. Statistical tools gap analysis and percentages were used to find out the desired result. Pearson coefficient was used to find out the association between the variables under study. Educational status of the entrepreneurs and their level of awareness were the variables used in the study.

GAP Analysis

Awareness reflects the marketing and financial factors. Educational difference is a constraint for the development of an individual as well as for the nation to which the individual belongs. It is very well known that it is impossible to succeed today in the modern world without the basic awareness of marketing and financial factors. Thus, in future, it will be impossible to succeed in the present-day business system without having the basic knowledge of finance and economics

Table 1: Descriptive statistics of Age distribution

		Age of the Respondent			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Up to 25 years	8.00	12.31	12.31	12.31
	26 to 35 years	24.00	36.92	36.92	49.23
	36 to 45 years	15.00	23.08	23.08	72.31
	45 to 60 years	18.00	27.69	27.69	100.00
	Total	65.00	100.00	100.00	

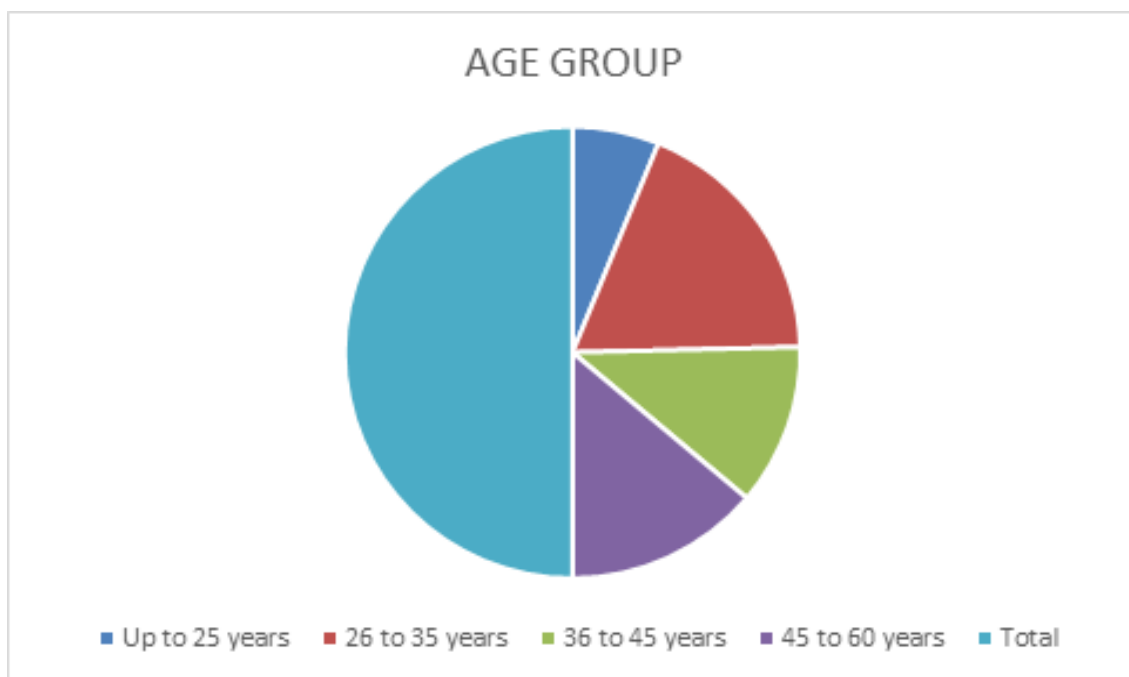


Table 2: Qualification

Qualification					
		Frequency	Percent	Valid Percent	Cumulative Percent
	Undergraduate	26	40	40	40
	Graduate	21	32.31	32.31	72.31
	Post Graduate	8	12.31	12.31	84.62
	SSC/Below	10	15.38	15.38	100
	Total	65	100	100	

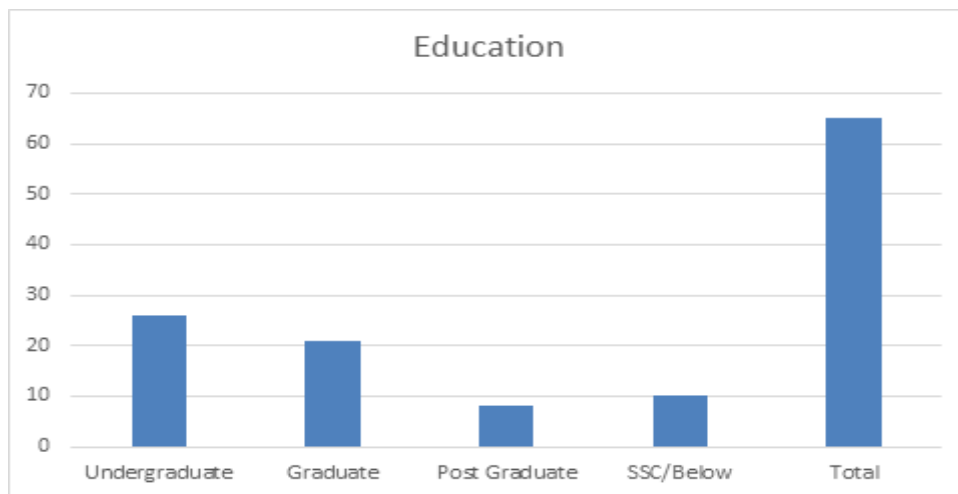


Table 3: Nature of Business:					
Nature of Business					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Manufacturing	26	40	40	40
	Service	15	23.07	23.07	63.07
	Trading	24	36.93	36.93	100
	Total	65	100	100	

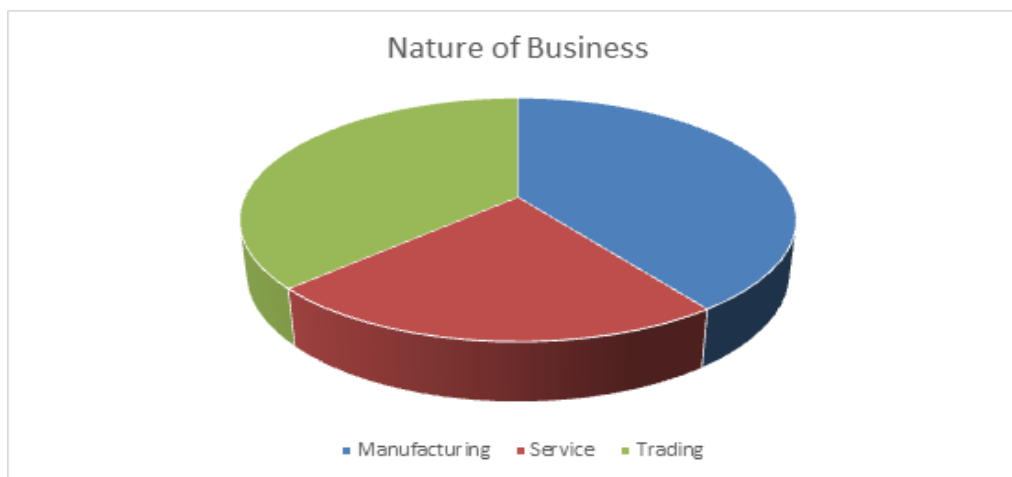


Table 4: Awareness relating to market and finance

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
1.Awareness about Govt Policies relating to market and Finance	65	2	5	4.72	0.573
2. Awareness about Investment avenues relating to product or service	65	2	5	4.26	0.567
3.Market knowledge for succesful entrepreneurial activities.	65	2	5	4.42	0.705
4. Awareness about coaching and training centers to	65	2	5	4.37	0.675

enhance market and finance skills					
5. Awareness relating to Competitors analysis	65	2	5	4.38	0.722
6. cost benefit analysis.	65	2	5	4.34	0.644
7. Hiring and Generating employment benefits knowledge	65	2	5	4.34	0.644
8. Linkages with Self Help groups	65	2	5	4.34	0.619
9. Getting financial expert advice before big decisions.	65	2	5	4.46	0.639
10. Studying market forces regularly before fixing price	65	2	5	4.42	0.707

Awareness relating to marketing area and finance is shown in the above table where we can see average that's mean and standard deviation relating to various categories are shown which are more or less above average.

Table 5: Anova for Educational qualification and Awareness

		Sum of Squares	Df	Mean Square	F	Sig.
Market Awareness	Between Groups	11.593	3	3.864	4.032	0.011
	Within Groups	58.468	61	0.958		
	Total	70.062	64			
Financial Awareness	Between Groups	4.466	3	1.489	2.631	0.05
	Within Groups	34.519	61	0.566		
	Total	38.985	64			

Table 6: Anova for Educational qualification and Awareness

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	2.051	2	1.025	0.935	0.398
Within Groups	68.011	62	1.097		
Total	70.062	64			

Since P value or significance value is 0.011 for Market awareness and 0.05 for financial awareness, so there is a correlation between Educational qualification and awareness in women entrepreneurs. Education can be considered as catalyst factor for determining knowledge and awareness of various domains of entrepreneurship. But as far as age is concerned it does not show any significant impact on awareness as P value is 0.398 which is more than significance level.

FINDINGS OF THE STUDY

1. Market and Financial awareness plays an important role in the success of any business. When it comes to women entrepreneurial projects, it is impareative that women face major challenge to maintain the business stability and to manage finances thereby analysing micro and macro environment market opportunities.
2. From the findings, it can be understood that there is educational difference in the awareness of the entrepreneur is related with the market and financial knowledge. The knowledge and awareness is based on the general understanding of overall environment which can be increased and leveraged through education.
3. Age difference is not been observed as a critical factor for sound market knowledge and financial awareness. The Age group does not determine the awareness level in women enterpreneurs in relation to market and finance expertise.

CONCLUSION

Market and Financial awareness which is highly important from the viewpoint of business. Informed decision making can lead to the profitability of the businesses. Entrepreneurs should be given proper training to improve their financial and market knowledge on time value of money and budget preparation. It is also important to keep them informed about various sources for availing credit at cheaper rates and different skill development centers for enhancing their marketing skills.

The majority of business owners are semi-skilled. It is critical to provide high-tech training and to develop their capabilities through various programmes. The importance of instilling marketing skills in girls cannot be overstated. The vast majority of them lack expertise in product and service marketing. Increasing motivation for increased innovation and creativity is required. At various levels, different programmes – workshops and

seminars – must be completed. Women are unaware of such initiatives such as Annapurna and stree Shakti, implying that their exposure to such schemes is basically non-existent. Various self-help organisations. Governmental and non governmental sources must be active enough to build a good climate for such things. Bank schemes also need to be brought to the attention of women. Collaborative efforts of banking system along with local self government must plan the systematic approach to tap women entrepreneurs.

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Synthesis, Molecular Docking and Their Antibacterial Activity of Acenaphthylene-1, 2'-Pyrrolidine-4', 3''-Indoline Heterocyclic Compounds

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ABSTRACT

In this study, series of acenaphthylene-1, 2'-pyrrolidine-4', 3''-indoline derivatives were synthesized and characterized. Also a molecular docking study of the best compound was analyzed on anti-bacterial evaluation. The 5'-(4-methoxyphenyl)-1'-methyl-2H-dispiro[acenaphthylene-1,2'-pyrrolidine-4',3''-indoline]-2,2''-dione compound showed good binding affinity with the protein. Additionally, in vitro antibacterial activity evaluated for all the synthesized compounds and shows good anti-bacterial activity.

Keyword: Synthesis, molecular docking, indoline, acenaphthylene, antibacterial

INTRODUCTION

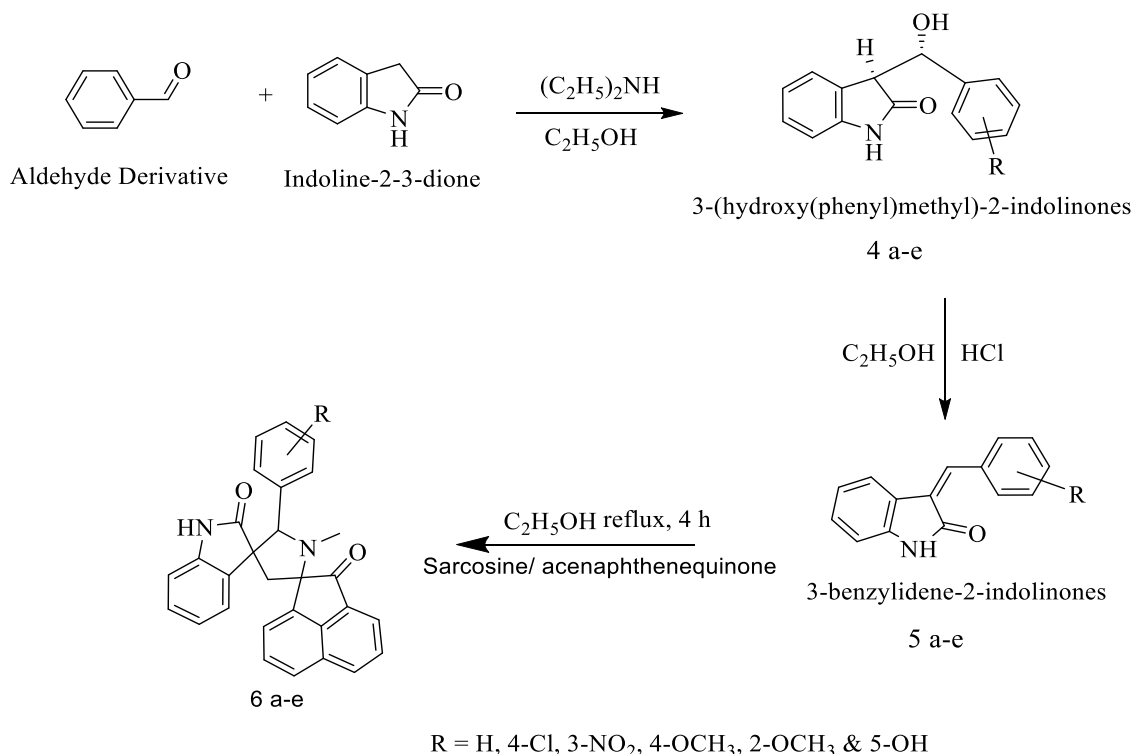
Any material produced by a living organism is termed as natural product [1, 2]. In the broadest context, natural products include any material created by life [3]. Full synthesis can be used to manufacture natural products, and diverse synthetic targets can be a critical addition to the promotion of organic chemistry. Thus, natural products stand in contrast not for all products of artificial synthesis but rather only with those that have no natural occurrence. In addition to cosmetics, dietary supplements and foods derived from natural sources, without addition of chemical additives, the term natural commodity was generalized for commercial purposes [4], even though separate meanings exist of natural food.

The meanings of natural products in the organic chemical industry are commonly limited to organic distilled compounds isolated from natural materials and generated by a primary or secondary metabolism process [5]. The concept is also more limited to secondary metabolites in the field of medicinal chemistry. Secondary metabolites are not necessary for life, but still offer an evolutionary benefit to species. Various secondary metabolites, as opposed to prey, predators, and opposing species, are chosen and configured by the process as chemical warfare agents [6-8]. Natural products also have pharmacological or biological activity and can be helpful in the treatment of diseases. Natural materials are also not only active additives for the more common drugs, but also for many modern ones. Furthermore, synthetic analogues of natural compounds may be prepared with enhanced strength and protection. Natural ingredients are also still used to locate the medication. Indeed, almost one half of the US is influenced by natural goods. Drugs licensed for food and medicinal use.

The chemistry of natural products is a distinct field of chemical science, and has played an important role in the chemical development of early preclinical drug manufacturing. Study on exploration, knowledge of the conventional medicines and ethno pharmacology, development of chemical separations technologies, the development of state-of-the-art approaches in determining NMR chemical structures and other techniques, and in the detection of pharmacologically useful areas of chemical diversity spaces. In addition, natural materials are developed by organic synthesis and have been influential in the production of organic chemicals, posing huge obstacles for synthetic strategies and tactics. [9-11]. The natural products are an important motivator for the creation of modern versions of older chemical reactions, such as the reaction of the Evans aldol, as well as for the discovery of entirely new chemicals (e.g. Woodward cis-hydroxylation and Sharp lower epoxy and Suzuki-Miyaura cross-coupling). In this sense, the training of new synthetic organic chemical chemists is focused on the natural products

METHODS

The reaction scheme of this study is shown in Scheme



3-(Hydroxy (Phenyl) Methyl)-2-Indolinone

A mixture of (0.01 mole of each) oxindole and benzaldehyde in 100 ml of ethanol, added 1ml of diethyl amine. The whole content was left overnight at normal temperature. The yellow colored needles were produced, and then recrystallized by using absolute ethanol. Yield: 72%. M.p.: 117-119 °C. IR data (KBr, ν/cm^{-1}): 1690 (CO), 3405 (NH), 3510 (OH). ¹H NMR (δ/ppm): 4.45 (s, 2H, CH), 6.21 (b, 1H, OH), 7.62 (m, 9H, Ar-H), 10.16 (s, 1H, NH).

3-Benzylidene-2-Indolinone

A mixture of compound (If) (0.01 mole), 1:2 ratio of ethanol and 25% of dilute HCl. Orange needles were formed after allowing the mixture to stand overnight. Yield: 86%. M.p.: 142-143 °C. IR data (KBr, ν/cm^{-1}): 1595 (C=C), 1638 (CO), 3415 (NH). ¹H NMR (δ/ppm): 7.64 (s, 1H, CH), 7.82 (m, 9H, Ar-H), 10.76 (s, 1H, NH).

1'-Methyl-5'-Phenyl-2H-Dispiro[Acenaphthylene-1,2'-Pyrrolidine-4',3''-Indoline]-2,2''-Dione.

To (0.01 mole of each) compound (Iif), acenaphthenequinone and sarcosine in 50 ml of ethanol added 1 ml of diethyl amine. This was refluxed with stirring for 14 hours followed by the addition of (10 ml) acetic acid. The whole reaction was maintained at ice cold temperature, after concentration Yielded the precipitate which was subjected to repeat washing with ethanol (cold) and finally recrystallized from glacial acetic acid to give the required spiro compound. Yield: 1.425 g (88%). M.p.: 136-140 °C. IR data (KBr, ν/cm^{-1}): 1599, 1719, 3245. ¹H NMR (DMSO/400 MHz, δ/ppm): 1.91 (s, 3H), 2.50 (s, 2H), 4.28 (d, 1H), 7.23-7.54 (m, aromatic), 11.18 (br, NH). ¹³C NMR (DMSO/400 MHz, δ/ppm): δ 21.40, 34.55, 39.98, 114.05-169.82. Mass: 430.1254. UV Visible (Ethanol): 245, 338 nm.

1'-Methyl-5'-(3-Nitrophenyl)-2H-Dispiro[Acenaphthylene-1,2'-Pyrrolidine-4',3''-Indoline]-2,2''-Dione

Yield: 1.495 g (73%). M.p.: 152-153 °C. IR data (KBr, ν/cm^{-1}): 1622, 1700, 3371. ¹H NMR (DMSO/400 MHz, δ/ppm): 2.49 (s, 3H), 3.43 (s, 2H), 4.08 (d, 1H), 7.32-8.38 (m, aromatic), 11.46 (br, NH). ¹³C NMR (DMSO/400 MHz, δ/ppm): δ 22.49, 39.97, 40.47, 52.92, 122.13-173.12. Mass: 479.1608. UV Visible (Ethanol): 246, 342 nm.

5'-(4-Methoxyphenyl)-1'-Methyl-2H-Dispiro[Acenaphthylene-1,2'-Pyrrolidine-4',3''-Indoline]-2,2''-Dione.

Yield: 1.448 g (78%). M.p.: 146-147 °C. IR data (KBr, ν/cm^{-1}): 1641, 1696, 3392. ¹H NMR (DMSO/400 MHz, δ/ppm): 2.42 (s, 3H), 3.39 (s, 2H), 4.10 (d, 1H), 7.82-8.67 (m, aromatic), 11.32 (br, NH). ¹³C NMR (DMSO/400 MHz, δ/ppm): δ 22.05, 39.64, 40.47, 52.92, 126.02-173.12. Mass: 460.2800. UV Visible (Ethanol): 249, 353 nm.

5'-(5-Hydroxy-2-Methoxyphenyl)-1'-Methyl-2H-Dispiro [Acenaphthylene-1, 2'-Pyrrolidine-4', 3''-Indoline]-2, 2''-Dione.

Yield: 1.472 g (81%). M.p.: 137-138 °C. IR data (KBr, ν/cm^{-1}): 1646, 1712, 3393. ^1H NMR (DMSO/400 MHz, δ/ppm): 2.21 (s, 3H), 2.53 (s, 3H), 3.37 (s, 2H), 4.12 (d, 1H), 7.31-8.16 (m, aromatic), 11.08 (br, NH). ^{13}C NMR (DMSO/400 MHz, δ/ppm): δ 21.09, 23.15, 39.84, 40.58, 62.92, 123.16-175.61. Mass: 477.4800. UV Visible (Ethanol): 256, 371 nm.

Molecular Docking Studies

Molecular docking study was performed, with the aim of evaluating the most preferred geometry of protein-ligand complex. Possible binding modes between the ligands and this target proteins were studied by CDOCKER (CHARMm-based DOCKER) protocol incorporated within DS. The algorithm offers full ligand flexibility and employs CHARMm force fields. Ligand binding affinity was calculated using CDOCKER energy, CDOCKER Interaction energy, Hydrogen bonds, binding energies, protein energy and ligand protein complex energy. The CDOCKER energy mentioned in negative values. More negative value energy indicated as higher binding affinity of the ligands with target protein.

ANTIBACTERIAL ASSAY

Test Organism

Acceptable gramme positive: *E. coli*, *Staphylococcus aureus*, *Salmonella spp.*, *Vibrio parahaemolyticus*, *Aeromonas spp.*, *Klebsiella spp.*, *Vibrio spp*, *Proteus Spp*, *Pseudomonas aerogotés*, and *Bacillus spp*. The major techniques of bacterial analysis were: Gram positive. The Department of Microbiology, Colleges of Christian Medicine, Tamil Nadu, India and IMPTECH, Chandigarh got all of the data and cultures sampled. In Mueller Hinton Broth (3 mL), each vaccine was vaccinated and accompanied by a 24-hour incubator at 37°C. After that the society was diluted.

Preparation of Inoculums

Developing cells in Mueller Hinton Broth (Himedia) at 37 °C for 24 hours, was used to prepare Bacteria inoculums. The above cell suspensions were dispersed with sterile MHB to give initial cell counts of about 10^4 CFU/millilitre. Sabouraud dextrose (SDB) yeast grown for 48 hours at 28°C.

Disc Diffusion Method

20 mL of Mueller Hinton Agar (MHA) acquired from (Hi-media, Mumbai) was used to prepare Petri plates. Antibacterial method was processed by disc-diffusion process. 100 microlitre of suspension having 10^8 CFU/mL fungal was used as test culture after becomes famous in the solidified media followed by drying for 10 min. Different concentrations were calculated for anti-hungarybehaviour tests (500 microgram/disk). Ciprofloxacin (10 micro grams/disks) were used as a positive(+) control disc for a duration of 30 min for a diffusion of 27°C and the surface of the medium, respective solvents were used to prepare negative controls.

RESULT AND DISCUSSION

Spectral characterization of 1'-methyl-5'-phenyl-2H-dispiro[acenaphthylene-1,2'-pyrrolidine-4',3''-indoline]-2,2''-dioneThe novel hetro 1'-methyl-5'-phenyl-2H-dispiro[acenaphthylene-1,2'-pyrrolidine-4',3''-indoline]-2,2''-dione compound F was synthesized from the reaction of oxindole, benzaldehyde, and followed by acenaphthenequinone and sarcosine. This compound F received in good Yield (88%). The melting point of the compound is 136-140°C. The IR spectrum of the compound F was confirmed from the peaks corresponding to carbonyl (1719 cm^{-1}) and NH (3245 cm^{-1}) groups and other frequencies. The ^1H NMR spectrum shows further confirmation of the formation of compound F. The proton signals obtained for aliphatic (1.91, 2.50 and 4.28 ppm), aromatic (7.23-7.54 ppm) and amine (11.58 ppm) protons. The obtained ^{13}C NMR spectrum of the compound F gives the corresponding carbon signals of the spiro compound. The mass spectrum shows the molecular ion peak at 430.1254. The electronic spectrum shows the bands in the UV region are 245, 338 nm.

Spectral characterization of 1'-methyl-5'-phenyl-2H-dispiro[acenaphthylene-1,2'-pyrrolidine-4',3''-indoline]-2,2''-dione.

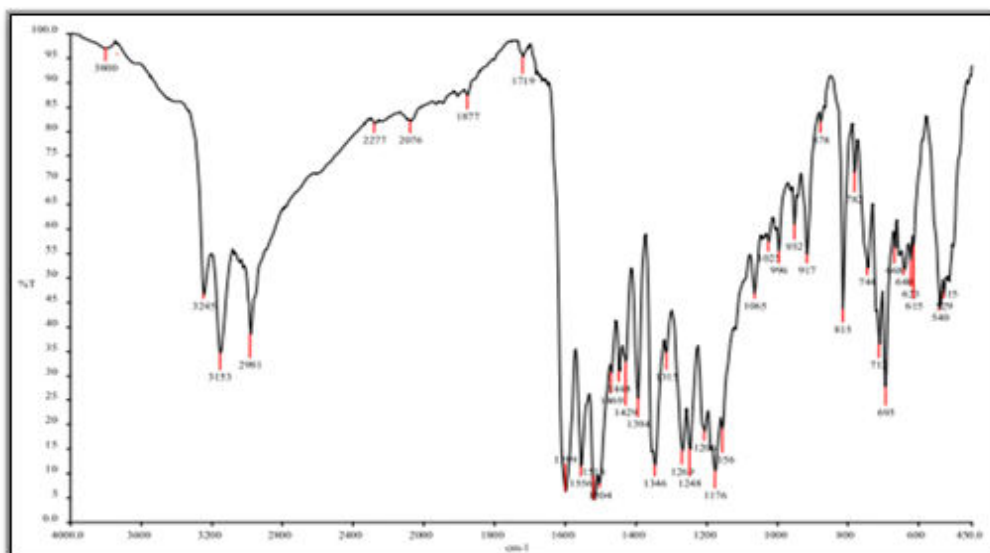


Figure 1: IR Spectrum of the 1'-methyl-5'-phenyl-2H-dispiro[acenaphthylene-1,2'-pyrrolidine-4',3''-indoline]-2,2''-dione.

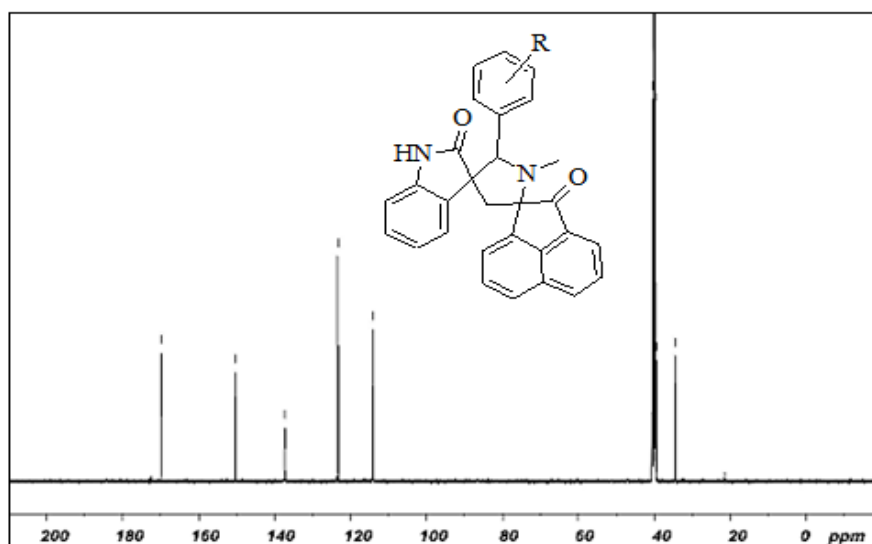


Figure 2: ¹³C NMR Spectrum of the 1'-methyl-5'-phenyl-2H-dispiro[acenaphthylene-1,2'-pyrrolidine-4',3''-indoline]-2,2''-dione.

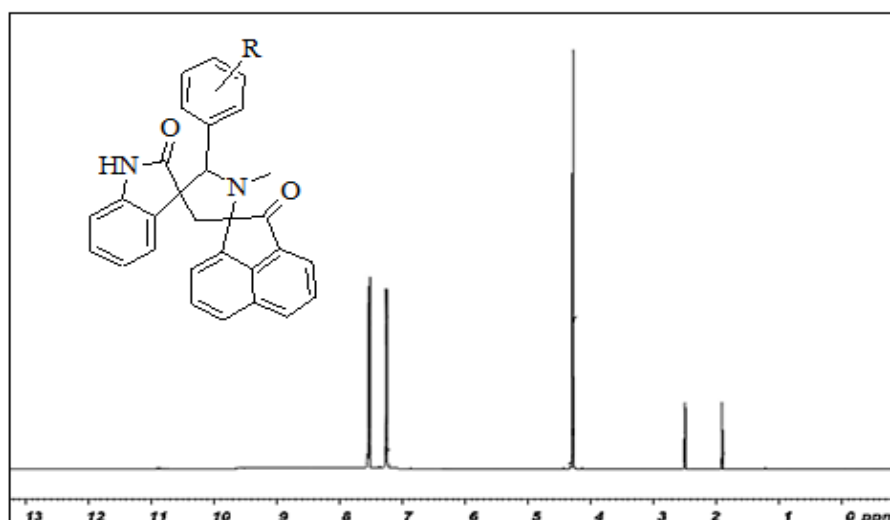


Figure 3: ¹H NMR Spectrum of the 1'-methyl-5'-phenyl-2H-dispiro[acenaphthylene-1,2'-pyrrolidine-4',3''-indoline]-2,2''-dione.

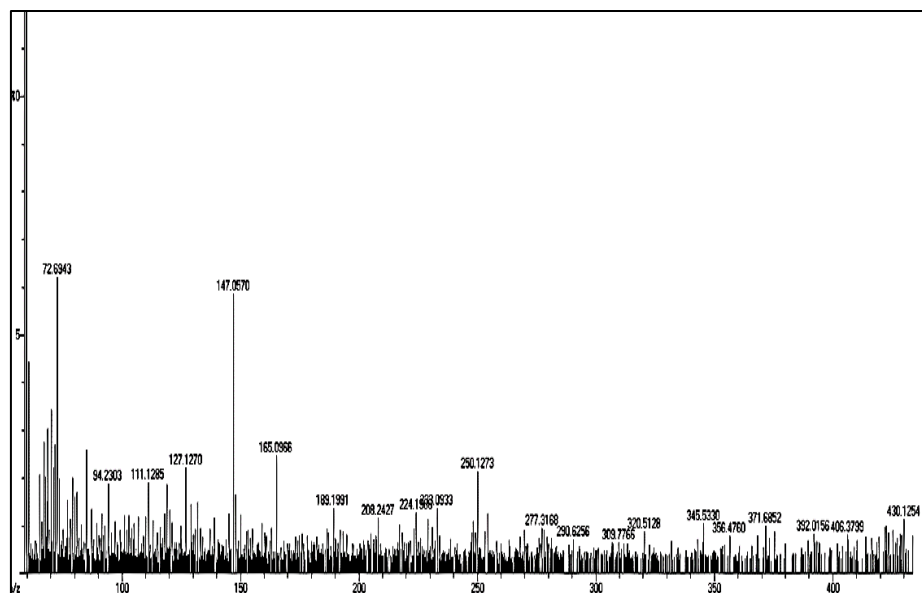


Figure 4: Mass Spectrum of the 1'-methyl-5'-phenyl-2H-dispiro[acenaphthylene-1,2'-pyrrolidine-4',3''-indoline]-2,2''-dione.

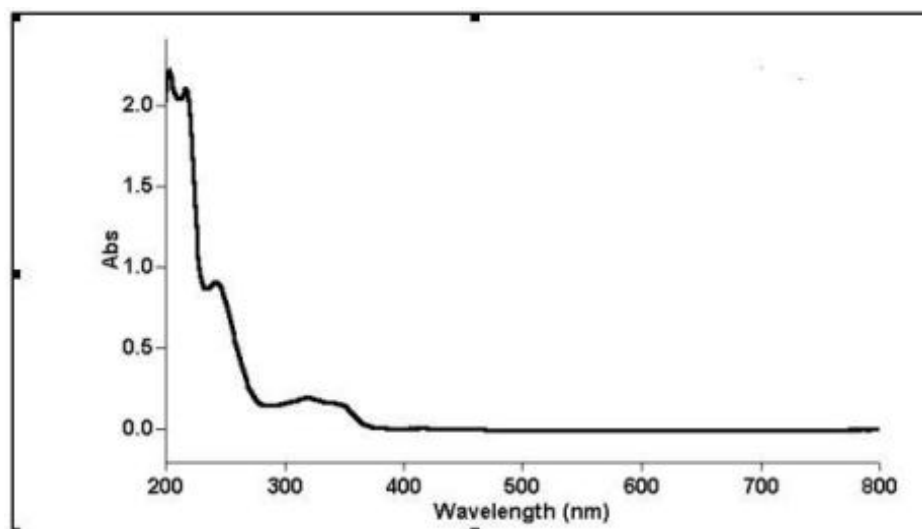


Figure 5: UV spectrum of the 1'-methyl-5'-phenyl-2H-dispiro[acenaphthylene-1,2'-pyrrolidine-4',3''-indoline]-2,2''-dione.

Molecular Docking Analysis

Molecules A to E were from first group (Indoline-2-3-dione derivatives) and F to J were from second group (oxindole derivatives). Fifth molecule of oxindole derivatives was found to bind with stronger affinity than all other molecules with target protein aspS (energy -48.89 kcal/mol). The ranking order of molecules based on the binding energy in complex with target protein were observed as following E, H, D, G, A, C, I, F, B and J. As a representative one, the binding interactions between the top ranked molecule and the target protein was analyzed. Totally 16 amino acids were found to fall in the interactions site with that of the 'molecule E'. Among them three amino acids were found to make hydrogen bond interactions (Gly172, GLN226, and ARG537) with that of molecule E. Further, amino acids ARG217, ARG225, PHE229, GLU482, and ARG537 which were reported to be present in the active site region were observed to be in the interacting region to that of the chemical 'molecule E' (oxindole derivative); possibly these amino acids would involve in hydrophobic interaction with that of the chemical hit. Since adenosine monophosphate (AMP) and aspartyl-adenosine-5'-monophosphate (AMO) were found to be part of the crystal structure, along with 10 of the research molecules these two were also docked as control (Figure 6 and Figure 7).

AMO and protein complex energy was calculated to be -50.76 while AMP-protein complex was -38.21. All of the ten derivatives docked complex with protein target were found to have stronger binding affinity (-41.70 to -48.89 kcal/mol) than AMP-protein (-38.21 kcal/mol), though none was found to be better than the AMO (-50.76 kcal/mol). However, top two molecules (5th from oxindole derivatives and 3rd from Indoline-2-3-

dionederivative) were found to have comparable binding affinity (-48.89 and -48.71 kcal/mol) with tartget proteinaspS as that of the AMO (-50.76 kcal/mol). Therefore, it may be inferred that these toptwo moleulescould be used as potential leads tofor further improvement and subsequent rationally designof novel drugs against aspartyl-tRNA synthetase from*E. Coli*.

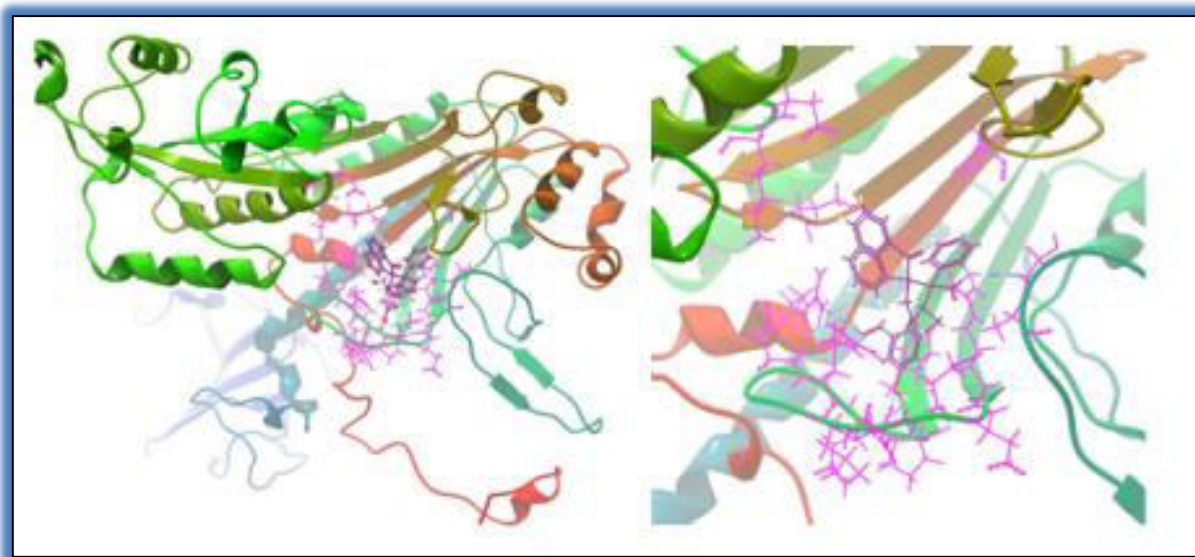


Figure 6: Binding interactions of Aspartyl-tRNA synthetases of *E. coli* and spiro compound B. The binding of the 'B' in active site of Aspartyl-tRNA synthetases

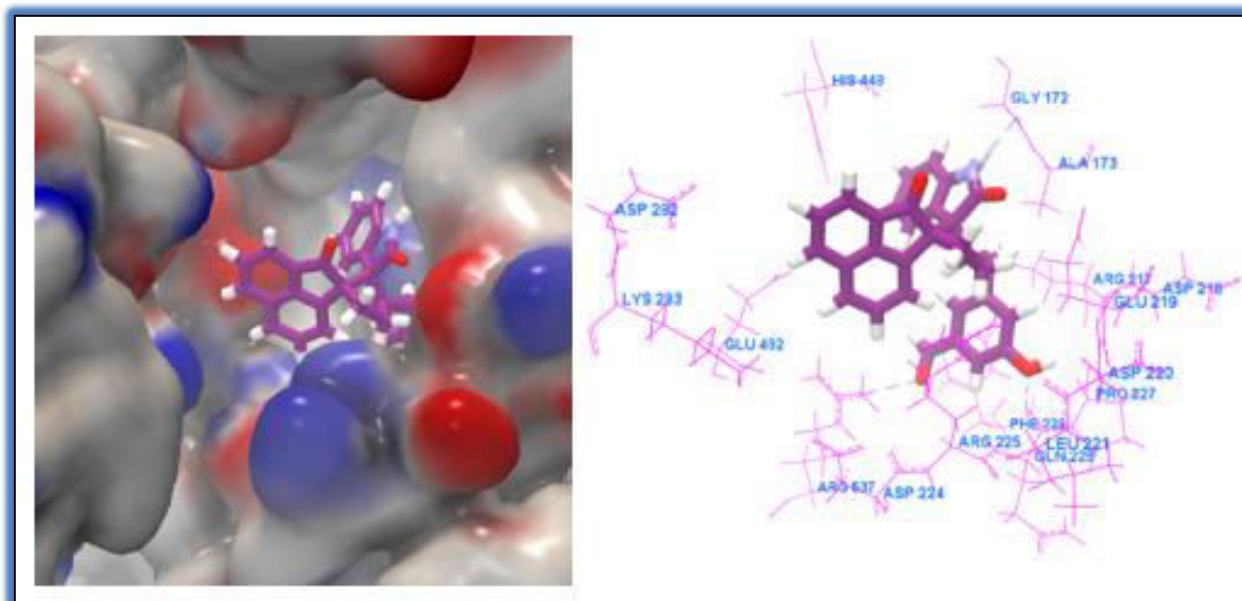


Figure 7: Binding interactions of Aspartyl-tRNA synthetases of *E. coli* and spiro compound B.

Antibacterial Activity

A number of bacteria and fungi were able to counter antimicrobial behaviours of the synthesised spiro compounds A and F in vitro. The experiments were performed with the tool agar location. For this study, test cultures of the bacterial strains *Staphylococcus aureus*, *E. coli*, *Vibrio spp.*, *Pseudomonas aeruginosa*, *Aeromonas spp.*, *Klebsiella spp.*, *Salmonella spp.*, *Proteus spp.*, *Vibrio parahaemolyticus* and *Bacillus spp.* were each inoculated into Mueller Hinton broth. Similarly, test cultures of the fungal strains, *Aspergillus niger*, *Aspergillus flavus*, *Penicillium spp.*, *Trichophyton* and *Candida albicans*. Sabouraud Dextrose Broth was inoculated. Check plaques with extracts from fermented cultures were serially detected. Normal antibiotics on the respective plates were also found as positive controls for each culture and for a comparative extract analysis using an antibiotic. Antimicrobial compounds were isolated at DMSO at 500µg/mL, and each normal antibiotic at DMSO at 10µg/mL. The plates were held at 37 C during the night in an incubator and the inhibition zones are measured at mm.

The literature study revealed that in the spiro compounds mentioned above, compound A showed a characteristic activity against *Candida albicans*, *Aspergillus flavors*, *Pencillium spp.*, *Aspergillus niger* and *Trichophyto spp.* It is interesting to note that numerous indole derivatives gives a large number of biochemical properties. If it is combined to other heterocyclic compounds in between a spiro carbon atom, the result will be greater spectrum of biological activities.

CONCLUSION

To conclude, we had synthesized several spiroheterocycles using 1, 3-dipolar addition through the process of heterocyclic compounds like oxindole with it carbonyl compounds such as acetophenone/benzaldehyde and their derivatives with acenaphthenequinone and amino acid (sarcosine). The reactions were found to produce high Yield of novel heterocyclic compounds which were characterized by spectrochemical methods (Infra-red, Nuclear magnetic resonance, UV-Vis and mass spectroscopy). The synthesized ten compounds were subjected to biological activity studies and few compounds were found to be better active. These ten novel compounds exhibit better activity than oxindole spiro compounds, and the results obtained are presented in this thesis.

Molecular docking studies enabled us to propose a possible mechanism of biological activity of oxindole and Indoline-2-3-dionederivaties. Further research is required to take forward the shortlisted two molecules towards drug designing. In conclusion, the Indoline-2-3-dione and oxindole based compounds display good biological activity than which may helps to develop further biological active derivative compounds.

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Review on Biodegradable Polymers

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ABSTRACT

Biodegradable polymers have advanced rapidly in recent decades and are now widely employed in agriculture, pharmacy, cosmetics, clinical biomedicine, the packing industry, medical, tissue engineering, and other disciplines. Due to the challenge of removing waste plastics that have accumulated in the environment, there is increased interest in biodegradable polymers as a result of rising petroleum prices and petroleum-derived plastics as vital raw materials. Biodegradable polymers have significant advantages over synthetic polymers in that they can be broken down into harmless compounds in the environment. These polymers were divided into two groups based on how they were made: natural and synthetic polymers. Biodegradable polymers are made from either biological or petroleum-based materials. The current review covers several biodegradable polymers, as well as current research, properties, global bioplastic production, application, and replacement for the old plastic.

1. INTRODUCTION

During the last century, synthetic plastic was thought to be one of the best materials for the future. But now, it poses a big threat to the environment. Synthetic polymers' major disadvantages are takes a long time for them to break down and they use non-renewable materials in their making². However, the manufacture and use of organic and bio-degradable polymeric composites is on the rise, which could help to alleviate environmental issues related to waste biodegradable polymers³. Seeds high in oil or fermentation products, as well as corn, soy, sugarcane, potato, rice, or wheat, are being investigated as raw materials for the production of biopolymeric materials⁴. Biopolymers made from biomass have a number of advantages, including the fact that they are biodegradable and relatively easy to recycle⁵. Biodegradable polymers, despite their drawbacks, have a number of advantages due to the fact that they are created from a variety of phytoconstituents. Fillers are used in synthetic plastics. Biodegradation is a term used to describe the process of biological degradation.

Biodegradation principles differ based on the polymer's use field (biomedical area or natural environment). Many different interpretations have been officially accepted, reflecting the history and intentions of the establishing standard groups. Environmental variables may affect the polymer before, during, or instead of biodegradation, hence abiotic reactions like oxidation, hydrolysis, and photodegradation must be considered. As a result, "biodegradation of polymers" refers to the degradation of its chemical and physical properties, as well as the reduction of its molecular mass to generate carbon disulfide, methane, and water.

To reduce environmental impact and petro-dependence, non-biodegradable polymers can be replaced with biopolymers. As an alternative bio-packaging material, bio-polymers enable packaging products to be completely biodegradable or compostable. Biopolymer biodegradation necessitates the hydrolytic or enzymatic breaking of linkages. Biodegradation is frequently defined as an event that occurs in living organisms as a result of enzyme action and/or chemical decomposition (bacteria, fungi, etc.). Before or during biodegradation, the structure and chains of polymers may be affected by photodegradation, oxidation, and hydrolysis. Biodegradable polymers can be classified into several categories based on their manufacturing processes and sources, as shown in Figure-1.

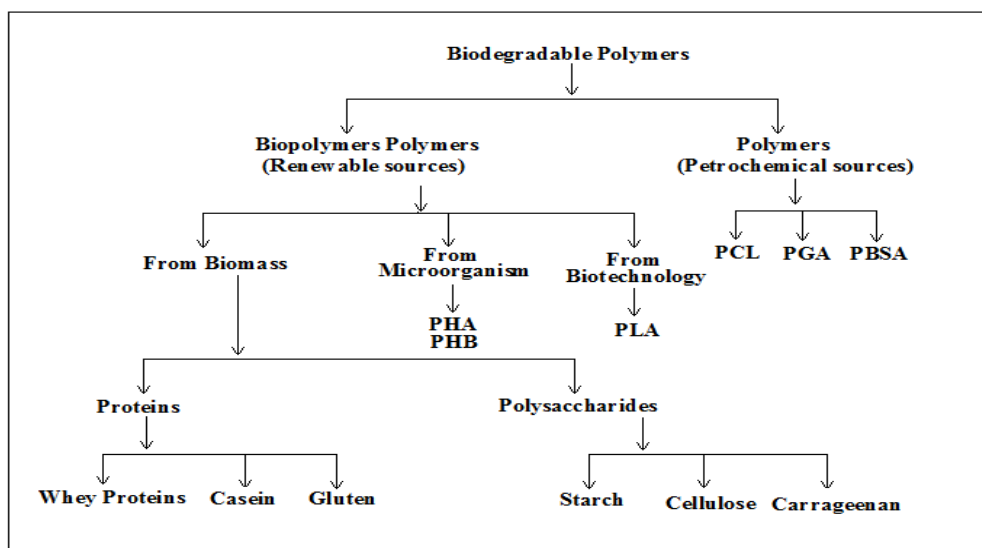


Figure-1: Two representative biodegradable polymers

1. POLYMERS OBTAINED FROM BIOMASS

1.1: Soy Proteins

Soy is a low-cost, long-lasting biopolymer that can replace petrochemical polymers in a wide range of applications. Soy protein (SP) is available in three concentrations⁶: soy isolate (90%), soy concentrates (65-72%), and soy flour (65-72%). SP molecules are made up of 20 different amino acids that interact heavily both structurally and intramolecularly. Because of these interactions, SP is unmeltable, and treating it as a thermoplastic polymer is impossible unless a significant amount of plasticizer is added⁷⁻⁸. Because of the high amount of plasticizer used in SP polymers, they have poor mechanical properties. However, when the plasticizers in SP plastics move during storage or service, the materials become extremely brittle⁹⁻¹². Tulamandi et al.¹³ reported that adding gelatin to papaya puree considerably improved the films' colour, tensile strength, and seal strength. When gelatin and defatted SP were added to the papaya pulp, the film displayed elongation, permeability, a large increase in water contact angle, and a decrease in water solubility. Zhao et al have combined¹⁴ soy protein with acrylic acid and cast it into biodegradable films to replace PVA films that are not biodegradable. SP films had much greater biodegradability, flexibility, and yarn adhesion than PVA, but water solubility and abrasion resistance were equivalent to PVA, indicating that grafted SP has a lot of potential to replace PVA in the domains of water soluble packaging films and slashing¹⁵.

Cellulose

Cellulose is the most prevalent naturally generated polymer, accounting for approximately 1.5×10^{12} t of total annual biomass output, and is regarded as a virtually infinite basic raw material for the growing need for environmentally acceptable products. The current lignocellulosic source of cellulose in forests is the most important. Wood and naturally highly pure cotton resources are used in industrial cellulose production¹⁶. Cellulose acetate, cellulose acetate butyrate, cellulose nano crystals (CNC)¹⁷, nanofibrillated cellulose (NFC), and bio-PE¹⁸ are all cellulose derivatives used in bioplastic manufacturing. The cellulose backbone has been discovered to be entirely biodegradable in a variety of biodegradation conditions and settings. Biocomposites manufactured from natural cellulose fiber (CF) and hydroxyethyl cellulose were also used to create green packaging film (HEC). Several single-component plasticizers have been examined for their influence on the mechanical and dynamic thermomechanical properties of films¹⁹. Additionally, the softening impact of a two-component plasticizer based on a deep eutectic solvent (DES) was investigated. An effect of a 2-component plasticizer that was made of deep eutectic solvents was also looked at. DESs have been discovered to be extremely plasticizers with potential for cellulose-based biocomposites, with plasticizing properties that are comparable to or better than traditional plasticizers²⁰. We compared the degradation of intact and smoked cellulose and plastic tobacco filters. Compared to cellulose filters, which take 2.3 to 13 years to dissolve on compost and soil surfaces, regular plastic filters take 7.5 to 14 years to disintegrate on compost and soil surfaces by grafting chitosan as a copolymer onto an oxidized cellulose matrix. The films demonstrated an antibacterial capabilities against *E. coli* and *S. aureus*, with a transparency of more than 80%. In a sausage model, the composites beat traditional polyethylene packaging materials, demonstrating that they have a lot of promise as packaging.

Starch

Starch is the second most prevalent biomass on the planet and the most common form of carbohydrate accumulation in green plants. Potatoes, maize, rice, and wheat^{23, 24} are all high in starch, which is a low-cost, easily available basic component. Starch is not meltable in its natural state and so cannot be utilized as a thermoplastic²⁵. Under the influence of plasticizers, shears, and heat, starch granules can be thermoplasticized by a gelatinization process, in which the granules are shattered and the ordered crystalline structure is lost²⁵. The resulting thermoplastic starch is a melt-processable starch (TPS). Bioplastics made from starch are suitable for use in manufacturing, agriculture, pharmaceuticals, and cosmetics. Because of its inexpensive cost and wide availability, starch is drawing increasing interest from researchers and businesses all over the world. Because of the significant number of phenolic compounds in the films, they have a lot of antioxidant action. The films had excellent thermal stability up to 240°C and decomposed in soil in 14 days. Czech et al.²⁷ studied a sophisticated pressure-sensitive twofold tape with a starch carrier and a partially degradable water-soluble improved adjustable adhesive with a starch carrier. They discovered that these newly developed biodegradable self-adhesive tapes had excellent tack and peel adherence, as well as superior temperature shear strength²⁸⁻²⁹, and that the total biocompatibility of the starch carrier and the partial biodegradability of the improved acrylic PSA were both confirmed. This environmentally friendly starch-based technology can be used to make environmentally friendly biodegradable products in the paper sector, as well as biodegradable labels that dissolve in water, medical tapes, and biological electrodes.

2. BIODEGRADABLE POLYMERS OBTAINED FROM PETROLEUM

2.1. Aliphatic Polyesters

This is the most extensively researched class of biodegradable polymers due to their wide range of properties and synthetic adaptability. Monomers come in many forms. There are a number of paths that led to the production of synthetic polyesters, all of which have recently been studied. Low molecular weight polymers are preferentially produced through poly-condensation of difunctional monomers. Aliphatic polyesters have garnered a lot of attention because they are nearly the only polymeric biodegradable compounds. They are biodegradable due to their hydrolyzable ester linkages. Aliphatic polyesters can be divided into two categories by the binding of constituent monomers. Polyhydroxyalkanoates make up the first group. These polymers, HO-R-COOH, are made from hydroxyacids.

2.2. Polycarbonate

PCL is biodegradable thermoplastic polyester with low permeability, low melting point, and great machinability, the polymerization of α -caprolactone results in it. PCL's usage as a biodegradable polymer in the packaging industry is limited because to its low melting point³⁰ and weak barrier properties and mechanical capabilities. PCL is frequently combined with other polymers (e.g., cellulose, propionate, polylactic acid, and cellulose acetate butyrate) to increase stress crack resistance, dyeability, and adherence and therefore broaden its use range.

2.3: Polyglycolide (PGA)

The most basic linear aliphatic polyester is PGA. The ring-opening polymerization of glycolide, a cyclic lactone, produces it. It is very crystalline, with a crystallinity of 45-55 percent, and is hence insoluble in most organic solvents. It has a glass transition temperature of 35-40°C³¹ and a high melting temperature of 220-225°C. PGA has remarkable mechanical qualities. Despite this, its low solubility and rapid hydrolysis rate, which produces acidic compounds, limit its biological utility. As a result, medical devices have been made using glycolide copolymers including caprolactone, lactide, or trimethylene carbonate³².

2.4: Poly (Butylene Succinate-Co-Adipate) (PBSA)

PBSA is formed when adipic acid is added to the mix. Their molecular weights differ by tens of thousands to hundreds of thousands of times. To raise the molecular weight, a little amount of coupling agents can be utilized as chain extenders³³. Polyester tensile strength falls as the secondary component (adipate) in copolyester (PBSA) is added, following the same trend as the other physical metrics.

3. POLYMERS THAT ARE BIODEGRADABLE AND COME FROM SUSTAINABLE RESOURCES

3.1. Microorganism-Derived Biodegradable Polymers

3.1.1. Polylactide (PLA)

PLA is typically made by polymerizing D- or L-lactic acid or lactide, a cyclic dimer of lactic acid, in a ring opening process. D-lactide and L-lactide are the two optical forms. L-lactide is the natural isomer, and DL-lactide is the synthesised isomer. Other synthetic methods have also been considered. PLA's -CH₃ side groups

make it a hydrophobic polymer. A hydroxy acids co-monomer component or racemization of D- and L-isomers³⁵ can be used to control the physical characteristics and biodegradability of PLA. Brittleness and limited heat stability are two disadvantages of PLA. PLA can be plasticized to improve chain mobility and crystallisation. Plasticization of PLA can improve chain mobility and crystallisation.

3.1.2. Biodegradable Polymers Obtained from Microorganism

a) PHA

Plants³⁶ or transgenic plants could be used to create PHAs in the future. PHAs can be stored as intracellular backup supplies by a number of microorganisms. In the presence of a plentiful source of carbon and a limited source of nitrogen, some organisms gain PHA from 30 to 80 % of their cellular dry weight. $[O-CH(R)-CH_2-CO]$ is the general formula for the monomer unit. PHA has different mechanical properties depending on the size of the alkyl substituent (R). It is possible to obtain rigid brittle plastics, flexible plastics, and strong tough elastomers. In the body, PHAs are completely degraded. Biodegradation begins when esterases from the chain's terminal monomer break the bond.

b) Poly(Hydroxybutyrate) (PHB)

PHB is biodegradable polyester that was developed biotechnologically in 1925 and has undergone substantial research. Methyl is the R alkyl substituent group. PHB has a crystalline structure that is more than 50% crystallinity. It melts at a temperature of 180 degrees Celsius. Pure homopolymer is a delicate substance. PLA³⁸, a synthetic degradable polyester, exhibits mechanical qualities that are similar to this material. The amorphous phase begins to crystallise during storage at ambient temperature. As a result, the polymer's stress and elongation modulus ($E = 1.7$ GPa) rise, making it more brittle and rigid. It has a tighter process capability window than standard plastics³⁹. In a variety of conditions, PHB is broken down by a variety of microorganisms (bacteria, fungus, and algae)⁴⁰. The hydrolytic breakdown produces 3-hydroxy butyric acid, a common blood component, but it does so slowly. Biodegradable polymers suited for sewage treatment have been created by grafting PHB with various monomers⁴⁰.

3.1.3. BIODEGRADABLE POLYMERS OBTAINED FROM BIOMASS:

3.1.3.1. Proteins

Proteins are thermoplastic heteropolymers with a high melting point. They're made up of polar and non-polar - amino acids. Amino acids can generate a variety of intermolecular connections, which can lead to a variety of interactions. These come in a variety of chemical capabilities and functional characteristics. The majority of proteins, especially fibrous proteins like silk, wool, and collagen, are neither soluble nor fusible. How a result, they are used just as they were intended. Filmmaking is made possible by the casting of film-forming solutions. Thermoplastic processing, which involves combining proteins and plasticizers, is a conventional method for processing protein-based bio-plastics. Plasticizers give films more flexibility and extensibility⁴¹.

a) Whey Proteins

Whey protein is a globular protein that is extracted from cheese whey. When compared to synthetic polymers, it is a natural product that is safe, biodegradable, renewable, and abundant. Heat-induced whey protein polymer exhibits excellent adhesion properties.

b) Casein

Casein is one of the principal proteins found in milk. Separating casein from other proteins can be accomplished by electrophoresis, chromatography, enzymatic separation, or membrane filtering. Casein is usually regarded as an intrinsically unstructured protein devoid of specific secondary structures. Casein is composed of four subfractions: S1-, S2-, S3-, and -caseins, which are phosphoproteins found in cow milk in a 4:1:4:1 molar ratio. These four amphiphilic protein fractions have an average isoelectric point of 4.1 to 5.3 and a molecular weight range of 19 to 25 kDa.

c) Gluten

On a kilo tonne per year basis, plant-based proteins are manufactured. Gluten is a protein that is produced as a byproduct of the starch production process. It is a low-cost material that is readily available in big numbers. The two principal protein families identified in wheat gluten are gliadin and glutenin. They are low in molecular weight and include a small amount of charged aminoacids. Glutenins, on the other hand, are three-dimensional proteins with a more complicated structure. They have at least ten times the molecular weight of gliadins. Wheat gluten components decay rapidly. Gluten is fully biodegradable, and the goods derived from it are completely harmless. Wheat gluten has been demonstrated to be an effective film forming agent. Without plasticizer, wheat gluten films are brittle⁴³. Water, glycerol, and sorbitol were used to determine the glass

transition temperature of wheat gluten⁴⁴. Due to their larger molecular weights and slower evaporation rates than water, glycerol and sorbitol are inaccessible to distinct zones. Plasticizing gluten with glycerol leads in the formation of a flexible phase. This phase has the structure of a pseudo-plastic viscoelastic solid. Due to the fact that cross-linking processes occur only above 60°C, the temperature range across which wheat gluten can be employed is limited.

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The Dilemma between Life and Death: Right to Abortion in the Indian Context

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ABSTRACT

The manifestations, legality, legitimacy, and prevalence of abortion are diverse across time and space. The abortion debate has polarized women, pitting them against each other in the binary of pro-choice and pro-life. While the followers of pro-choice views the right to an abortion as inherent to a women's right to sovereignty, the latter believes that it is unethical to kill a unborn baby as it is in a way denying the foetus' right to life. They strongly believe that the child's right starts while it even remain the foetus. Against this backdrop the study will shed light on the following issues:

- How the Reproductive debate has been evolved?
- How it is relevant in the Indian Context where female foeticide is a harsh reality?
- How one should address the dilemma between life and death in the context of pro life-pro choice debate?

Keywords: Abortion Right, Pro Life, Pro Choice, India

INTRODUCTION

The dilemma pertaining to abortion has been a long and complex one. Its manifestations, legality, legitimacy, and prevalence are diverse across time and space. The abortion debate has polarized women, pitting them against each other in the binary of pro-choice and pro-life. While the followers of pro-choice views the right to an abortion as inherent to a women's right to sovereignty, the latter believes that it is unethical to kill a unborn baby as it is in a way denying the foetus' right to life. They strongly believe that the child's right starts while it even remain the foetus. So it is easy to decipher that while the advocates of abortion asked the question 'what about the woman', the Pro-lifers replied by posing another question 'what about the baby'. Although both, pro-life and pro-choice agree that a fetus is a human being belonging to Homo Sapiens species, pro-choice supporters argue that the unborn is not intrinsically valuable because of a lack of ability to reason and self-awareness (Beckwith, 2007). So there are innumerable arguments and counter arguments without hyphenation and the dilemma remains that which one is more significant – the mother's right to terminate pregnancy or the foetus' right to life. This pro-life and pro-choice debate has an western root which is more about reproductive freedom. But the Western standard of looking at abortion debate is not fully relevant in the Indian context. The situation is entirely different here. Sex selective foeticide is a social ill in India which cannot be explained through the prism of abortion debate only. It must take into account the problems of forced female foeticide.

Historical Perspectives on Reproductive Debate

Fertility control is not a modern day phenomenon. It has its roots throughout ancient, medieval and present epochs. However, there existed debates over the rights of the foetus and the question of ethics pertaining to the act of abortion. Around 500 A.D. ancient Jewish scholars were among the first group to question if the foetus was considered as having the same rights as a person. In this instance, it was decided that while the fetus was inside a woman, it was part of the woman, and as soon as the child was born, it had the same rights as any person. Scholars such as Aristotle and Plato debated the lack of participation of the state in limiting women to a certain number of children, and if they passed such a number, then an abortion should be performed as soon as possible (McFarlane and Meier, 2001). The Romans had the same beliefs as the ancient Jews, i.e. the child had all of a person's rights after birth, and no rights while inside the mother. The Greeks, the Egyptians used plants as contraceptives, the practice of which was passed to Romans later. During the medieval age, the Western Europeans were also efficacious with birth control accomplishments. Though Malthus was an anti abortionist but his work on the effects of population growth on food security in the 1700s indirectly influenced the use of contraception.

In a sharp contrast, during the A. D. 400s, St. Augustine condemned the use of contraception which might be popularised by the Catholic Church. Mention must be made here that both the Catholic and Christian Churches were against abortion as they considered human lives as sacred. They emphasized ethical beliefs, morality and values (Lopez, 2012). Even Mary Wollstonecraft also condemned those who would “either destroy the embryo in the womb or cast it off when born,” saying: “Nature in everything deserves respect, and those who violate her laws seldom violate them with impunity”(Foster, 2015). The ancient fore-mothers of American Feminism—

facing conditions similar to those in developing countries today—were strongly opposed to abortion; despite their own struggles, they believed in the worth of all human lives. It was only during 1960s, the waves of Western Feminism opened avenues for abortion rights. The historic Roe v Wade judgement legalized abortion in America in 1973, where the court recognized that the constitutional right to privacy "is broad enough to encompass a woman's decision whether or not to terminate her pregnancy" (Planned Parenthood.org) thereby respecting one's personal decision regarding 'bodily integrity, identity and destiny". It had protected the right from undue governmental intervention. It provided the women agency in their reproductive rights. After the Roe v. Wade 10 case, European and American countries started to legalise abortion. During the last thirty years, since 1970s many countries have liberalized their abortion laws. Roe case has been subsequently modified by the US Supreme Court in Planned Parenthood v. Casey where the legality of the abortion law is now linked to the viability of the foetus rather than the rigid third trimester test laid down in Roe case.

The Indian Context: Gender equality is and must be central to any discussion on human rights. A fundamental principle of the United Nations Charter adopted by world leaders in 1945 is "equal right of men and women" and protecting and promoting women's human rights is the responsibility of all States. Despite its existence, millions of women around the world are subject to discriminations as they lack decision making power. In poor countries the problems are more acute as the women have to fight with many ills of the society. India is not an exception. Here women often have to struggle to establish her identity, and to exercise the right to life, the right to be free from torture, the right to health, the right to privacy. When it comes to the question of right to abortion, their freedom to determine their sexuality, fertility and reproduction are issues that are often curtailed.

Legal bases of Right to Abortion in India: In India, the Central Family Planning Board on August 25, 1964 recommended the Ministry of Health to constitute a committee to study the need of legislation on abortion. The recommendation was adopted in the later half of 1964 constituting a committee which consisted of members from various Indian public and private agencies. The committee – called Shantilal Shah Committee. After analysing a vast expanse of statistical data available at that time, this committee issued its report on December 30, 1966. On the basis of this report, the government passed the Medical Termination of Pregnancy Act, 1971 (MTP Act of 1971) and liberalised abortion laws in India. The liberalization of abortion law must be understood from three points of view: that of the women's "physical and mental health, and her freedom," of the "child who may be physically deformed or mentally retarded, and the unwanted child who becomes the unloved, uncared for, and in time the delinquent child," and lastly, from the point of view of the "state and society and the totally socio-economic and demographic picture" (Chandrasekhar, 1974). So overpopulation is a guiding force too.

It is noteworthy that the MTP Act was implemented in the month of April, 1972 and again revised in the year of 1975 to eliminate time consuming procedures for the approval of the place and to make services more readily available. This Act was amended in the year 2002 and again in 2005 for facilitating better access to women. The Preamble of the Act states, "An Act to provide for the termination of certain pregnancies by registered medical practitioners and for matters connected therewith or incidental thereto"(Medical Termination of Pregnancy Act, 1972). The act has only 8 sections outlining the time, place and circumstances in which a pregnancy may be terminated by a registered medical practitioner. The act though mandated that "no pregnancy shall be terminated except with the consent of the pregnant woman", (Medical Termination of Pregnancy Act, 1972 (Act of 1971), Preamble.)but it failed to realize the fact that in reality women may donot have the free choice. That is the act is silent about the much practiced forced sex selective foeticide in Indian society. Though the MTP act was devised as a means of family planning and population control and to avoid unsafe abortions but it has been used awefully as a tool for female foeticide in India which is a by product of deep rooted patriarchal domination practiced in the Indian society(BBC News).

The Harsh reality of Sex Determination and Female Foeticide in India: Pre-natal sex determination for sex-selective abortion is a common phenomenon in India because of the wish for male heirs. The cultural preferences for male child over female ones have resulted in the disappearance of girl children. While census data shows that India's overall gender ratio is improving, its child gender ratio is on the decline: between 1991 and 2011, the country's female-male gender ratio rose from 927:1000 to 940:1000, but its child gender ratio fell from 945:1000 to 914:1000 (The Guardian, 2014). Sometimes economic insolvency of the rural mass is cited as the cause behind such actions. But urban settings and prosperous states are not immune from such practices. One of the richest states in India is Punjab, where, in the 2001 census, there were 125 boys per 100 girls in the naught to six age group. The predominant pattern is to use sex selection not for the first child but for subsequent children; the ideal seems to be two sons and one daughter (The Guardian, 2011). To explain the grim situation one can cite the concept of "missing woman". Amartya Sen coined the term "Missing women" when he tried to show a worsening sex ratio (number of females per 1,000 males) in countries such as India and China. He

estimated that more than 100 million women were missing due to gender discrimination. And female foeticide is one of the reasons for that. The problem has become aggravated by the higher mortality rates of girls as boys receive better care. Today it has become more frightening when even in the matrilineal societies there is steep decline in the number of girls under seven in the southern state of Andhra Pradesh and in Sikkim, Nagaland, Manipur and Tripura in the north-east. Even though these states have registered numbers much higher than the national average, the decline is too substantial to ignore (BBC News, 2011).

There were several steps taken to counter the problem. The Forum Against Sex Determination and Sex Pre-selection (FASDSP), which produced legislation banning sex selective abortions, formed in 1984. It argued that the issue of female foeticide had to be seen as “(a) an integral part of women’s oppression and discrimination, (b) misuse of science and technology against people in general and women in particular, (c) a concern of human rights.” The way in which the Forum shaped and defined the issue of female foeticide as a form of violent gender locates their objective within the larger women’s movement to end violence against women (Everett, 1998). Another milestone was the Pre-Conception and Pre-Natal Diagnostic techniques Act which was passed in 1994 to prohibit sex determination. It was amended and effectively implemented in 2003 and strictly amended in 2011. However, its effectiveness has been questioned. It lacked the machinery to investigate whether unregistered clinics were carrying out Sex Determination Tests (SDTs). Sometimes district health officers are unaware of the provisions of the act; sometimes families and doctors collude in the practice, and records from ultrasound clinics are rarely scrutinised by health officials. There exist many unregistered ultrasound clinic and sometimes abortion took place inefficiently at home causing maternal death. Furthermore, in a research it is found that the economic boom in India has accelerated the trend of sex-selective abortion. This factor is combining with technological developments in ultrasound that make scans more reliable earlier in pregnancy, and the machinery more mobile, increasing penetration across the country.

In such a situation the government is also trying to address the problem. In January 2015, the Ministry of Women and Child Development (in collaboration with the HRD Ministry and the Ministry of Health and Family Welfare launched the “Beti Bachao, Beti Padhao” campaign which addressed a number of issues faced by the girl child in the country, including that of female foeticide. Police raids are also made in abortion centres and strong vigilance has been conducted to stop pre natal sex detection. But such moves are not enough to crusade against the problem. Right to abortion has been legalised in India before many Western countries but if the right is practiced for sex selective destruction of foetus, it actually contributes towards fierce exploitation of womanhood.

Beyond Pro Life and Pro Choice Debate

When does the life begin has not been recognized by any law. Considering Indian case it can be said that the Pro life/ pro choice is not that relevant as it is in the US. Here the women are often denied the basic human rights. They are murdered at the womb in many places. Their right to lives are jeopardised in that way. In the liberal abortion regime of India women's choice to end a pregnancy is limited among very few enlightened families. In many cases it is the decision of the family to end a pregnancy for boy preference. For that pre natal sex determination plays a crucial role. Though there are few exceptions like pregnancy out of rape or contraceptive failures. Right to abortion is a double edged sword here. Without it women would be denied agency to the reproductive rights. On the other hand the mal practice of the right may terminate her existence in the womb through sex selective abortions. We can be pro life only when the right to life of the unborn can be secured irrespective of its sex. Similarly we belong to pro-choice group only when the choice to terminate a baby is entirely decided by the mother for her own reasons. It must not be dictated by anybody. The state has a role to play here. It should guarantee first that all people are equal. It must protect women's right to life, dignity, bodily integrity, privacy, sexuality first. It must take more rigorous punitive measures against foeticide. Then only we may voice or debate over pro-life/pro-choice polarity.

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Mapping the Structure of Employability Skills: A Co-Authorship Analysis

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ABSTRACT

Hard skills and employability (soft) skills are essential in the workplace. Research studies found an 80% contribution of employability skills to long-term work success. Technical skills are required only for the specified work, but employability or soft skills are needed even when a person is not working. These skills become an essential part of one's life, and without these skills, no one can stay in a job. This research study highlights the significance of employability skills and identifies the most collaborated countries and authors in this research field with the help of bibliometric analysis. This study indicates that the research on employability skills is minimal. Although the United Kingdom is the most collaborated country in this research domain. Furthermore, the study revealed that out of 1871 authors, nine authors are most collaborated to research employability skills. In the modern era, the importance of these skills is recognized by employers and students, teachers, and policymakers. This paper provides insights to future researchers in formulating their research problems. Further, various policymakers used this research to identify the significance of employability skills.

INTRODUCTION

Human resources are the total competency, knowledge, skills, aptitude, experience, and talent of the organization. Also, employees' principles, beliefs, relations, standards, and benefits are a part of human resources. A human being is treated as a resource in the organization as it possesses the knowledge, skillset, expertise, commitment, aptitude etc.

Skills

Skill is a set of abilities of a human being to perform a piece of work. It is defined as the power, capacity, and talent to do a work or job or activity with excellency, and the distinction is achieved by continuously practising it. It is that ability that one gains from understanding, awareness, experience, practice, etc., to do work well. Skills are those proficiencies that one can develop through training, experience, exercise, and learning. It is learned behavior by continuing practice and experience. Skill refers to expertise or ability to perform a task obtained by an individual through systematic education, focus, knowledge and continuous training. It is the outcome of regular efforts and improvements made to gain proficiency. It requires lots of action, hard work, dedication, willingness, time, and other resources to develop it. However, the skilled workforce is more trained, motivated, experienced, has higher pay, and has higher targets than others. These are the abilities or talents that facilitate people to get along with friends, colleagues, and customers and make comfortable with each other; they also help make sound decisions.

A skill is a learned talent used to carry out a defined task with a predetermined outcome. Often, Skills may be divided into two categories: work-related general skills and specific skills. Work-related general skills may comprise discipline, leadership, self-management, communication and awareness, whereas work-specific skills may be advantageous only for particular tasks.

Skills: Hard Skills & Soft Skills

According to Digby Jones, "A degree alone is not enough. Employers are looking for more than just technical skills and knowledge of a degree discipline. They particularly value skills such as communication, team-working and problem-solving. Job applicants who can demonstrate that they have developed these skills will have a real advantage".

When individuals join an organization, they participate with technical abilities, experience, cognitive skills, ambition, feelings, ethics, etc. Only holding some technical degrees would not assure one of getting and being successful in a job, but one must have some other skills known as employability or soft skills. To cope with the competitive corporate world, one must have two skills, i.e., hard skills and soft skills. Soft skills are those essential skills required for acquiring a job, maintaining, and sustaining that job. Soft skill is a group of capabilities, attitudes, talent, habits, attitudes, and interpersonal skills, and hard skill is defined as experiences, practical skills, education etc. Though they are referred to by many other names such as generic skills, and core skills, the industry's preferred name is "Employability skills".

Skills: Are the abilities toward goal orientation, which is well-organized behavior that can be learned through experience and practice?

Figure no; 1- Hard skills v/s Soft skills

HARD SKILLS:	SOFT SKILLS:
<ul style="list-style-type: none"> • Work oriented • technological skills • tools and techniques • specialized skills • tangible • non-transferable • predictable • measurable 	<ul style="list-style-type: none"> • employability skills • experience-based • people skills • inter-personal skills • transferable skills • non-technical • behavioural aspects • intangible • complementary to Hard skill

Professional Skills

In the current scenario, researchers also focused on professional skills. To become proficient, one must possess some skills that help him at the workplace and outside it. Professional Skills are the skills needed to carry out a business/profession. Every profession demands some area/domain-specific professional skills and domain-general professional skills. Domain-general professional skills are also called professional skills, and these are the set of skills required in almost every profession. Professional skills are also not the hard skills which are not taught in any school, college or university; these are not even taught through any institute or certification courses; these skills are learnt by self-determination and experiences. In general, professional skills are the good manners and etiquette every professional carries to perform well in his profession. Besides the domain-specific skills, these skills are required to complete well in any discipline.



(Figure no.-2; Professional skills)

(Source: <https://resumeskillforjobs.com/what-are-professional-skills-types-of-professional-skills/>)

Employability Skills

Unlike technical, practical or hard skills, employability is a wide-ranging skill rather than work specifically. Employability skills are those essential talents required for attaining, maintaining and performing best in the workplace. Employability is the minimum basic or necessary skills for getting, retaining, and success in work. The term employability consists of two words, "Employment + Ability", which concerns the ability to be employed. The word "Employability"-states the meaning itself 'only the able get employed'. Employment is defined as the contract between two parties in which one party promise to perform some paid work for the other. The word "employability" is frequently used with the conception of work readiness. Yorke (2010)

opposes that work-readiness is only that condition which is enough for gaining early employment, while employability refers to some necessary skills but not sufficient for gaining employment. At all any terminology is used, it would be better to holistically think that a man must be both employable and work-ready to improve their possibility of gaining employment in the present competitive world. Employability skills are measured as requirements for various job positions. If an individual possesses employability skills, he needs to be capable of exploiting and policing his talent and marketing and selling them.

Definitions of Employability Skills

Fundamentally, employability is all about knowledge, learning how to learn, and gaining all the skills required for a job. Employability is not a product but rather a procedure that involves effort, experience, and knowledge. Various theorist gives employability definitions, but all are divided into two sets in, which first relates to the capacity of the student to get, maintain and develop in a job after completing education. Another is associated with developing the students' skills (abilities, awareness, attitudes and talent) and endowing the student as a vital lifelong learner.

1. According to Harvey, "Employability skills are the ability of a man to get a satisfying job".
2. Conference Board of Canada released Employability Skills 2000+, defines employability as "the skills you need to enter, stay in, and progress in the world of work".
3. As per Hillage and Pollard, "Employability skills refer to a person's capability of gaining initial employment, maintaining employment, and obtaining new employment if required".
4. Lankard defines Employability skills "as including personal image, interpersonal skills, and good habits and attitudes."

The word Harvey addresses a narrow concept of employability. The Conference Board of Canada (2000) defined the broader term employability and released a report on Employability Skills 2000+. Various employability definitions have been established based on corporate, research, commerce, and education efforts. Employability is the enhancement of abilities, skills, and personal attributes that help an individual get a job, maintain it and benefit the employer. However, employability skills are those abilities and talents that make a person employable.

Employability skills are essential skills needed in every sphere of today's workplace for practical employment sustainability and to become successful in a job. As technology changes, so also do the employment requirements changes. Because of this reason, employees of a particular discipline must be equipped with all those necessary abilities demanded in the 21st-century. The modern era requires employees with technical (hard) skills and some employability (soft) skills. Employability defines a set of skills, abilities, competencies, and attributes that make an individual get employment. The term employability is often used to describe a person's work-readiness capability. Every employee in the firm is considered the representative and ambassador for that firm, and organisations should always want to recruit those employees who have required employability skills.

Gazier (2001) defines the Employability Theory that Has Gone Via Seven Different Stages Over the Past Century, Which is as Follows

1. Dichotomic Employability

This approach developed with starting phase of the 20th century in the U.K & U.S.A. This approach distinguishes those who can be employed and those who can't be used. This distinction is based on the Anglo-Saxon group of migrants from northern Europe who settled in England near the Fifth & sixth centuries. In this regard, it would become essential for reformulation of the Anglo-Saxon group where the contradiction between the "deserving poor" (hard working and honorably upright individuals who fall due to difficult time or lousy luck, e.g. ailment, illness or death of a partner) and the "undeserving" poor (those who were sluggish, lazy and morally corrupt). The former category deserves donation; the latter needs counselling and motivation to reform.

2. Socio-Medical Employability

This approach was developed around the second world war, particularly in the U.S.A, Britain, and Germany, as these areas directly affected the worst war conditions. Unemployment increased due to a deficit of natural and human resources. And also, the social, physical and mental states of people were not too good, that's why the unemployment situation occurred. Neither the employers have sufficient resources to deploy people in their organization nor the physically and mentally fit for the jobs.

3. Manpower Policy Employability

This approach extended the social-medical method and emerged in the 1960s, mainly in the U.S.A. The focus of this model was on the gap between the demand and supply of knowledge, skills and attitude in the society. The people's skills, abilities, and inside were insufficient as demanded by the industry. So, there was unemployment due to a deficiency in human resources skills.

4. Flow Employability

In 1960, this approach primarily emerged in France. This approach is accounted for the demand side of employment and the approachability of employment opportunities with the native and nationwide economies. It defines employability positively that one looking for a job must match the objective expectation.

5. Labour Market Performance Employability

This model began worldwide in the later period of the 1970s. This model centres on the assessable workforce outcomes that result from definite policy formulation. These methods account for time spent on employment, working hours and wage rate structure.

6. Initiative Employability

At the end of the 1980s, this approach was found in the human resource development writings in North U.S.A & European countries. In this literature, a discussion was on those "salaried parson" working in the same organization throughout their whole working life; they did not take any initiative to change the organization for growth. After leaving school and college, they joined the organization and worked in the same until retirement and that job ere called "a job for life". This version claimed that a significant career improvement now required expanding various competencies, abilities, and attitudes that might make employees succeed in their present working occupations and be optimistic about catching an excellent job in a similar organization. The focus here is one's initiative for their self-development by developing their skills and agency.

7. Interactive Employability

Following the earlier approaches, the interactive process was developed according to the changing requirements of the environment. Whereas accommodating the significance of individual agency, this description searches for balance with the personal agency (when a person acts on his behalf) and development of some of the understandings of the French movement employability school regarding social forces. Therefore, it was contended that a person's employability is somewhat comparative to the employability of competitors in the labour work market and partly with self-confidence. The native and national demand situation is also considered, as per the regulations, policies and institutes that manage the workforce, highlighting the growth of institutional economics in this era. Thus, this description connects employers and policymakers in the employability hurdles and individuals.

These explanations would not be understood merely as marking the development to present orthodox; relatively features can be understood as current demand and other considerations. Being employed refers to having a job; being employable means having the necessary skills to get a job needed to maintain employment and progress.

Life Skills - The World Health Organization(WHO) defines life skills as "the abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demands and challenges of everyday life". UNICEF, UNESCO and WHO list ten core life skills as "problem-solving, critical thinking, effective communication skills, decision-making, creative thinking, interpersonal relationship skills, self-awareness building skills, empathy, and coping with stress and emotions".*

Fundamentally, employability is all about knowledge, learning how to learn, and gaining all the skills required for a job. Employability is not a product but rather a process that requires effort, experience, and knowledge (Hillage& Pollard, 1998).

METHODS

The technique used: A bibliometric analysis technique is used to analyze the result of the study. In this study, we used the following type of analysis:

- Co-Authorship analysis among countries
- Co-Authorship analysis among authors

Search Strategy: we used ("*employability skills*") in the search string within the title, abstract and keywords in the Scopus database.

Software: We used VOS viewer software to analyze the study's retrieved document. Various previous researchers used this software to analyze the retrieved document. The reason is that this software is efficient in mapping the structure among clusters.

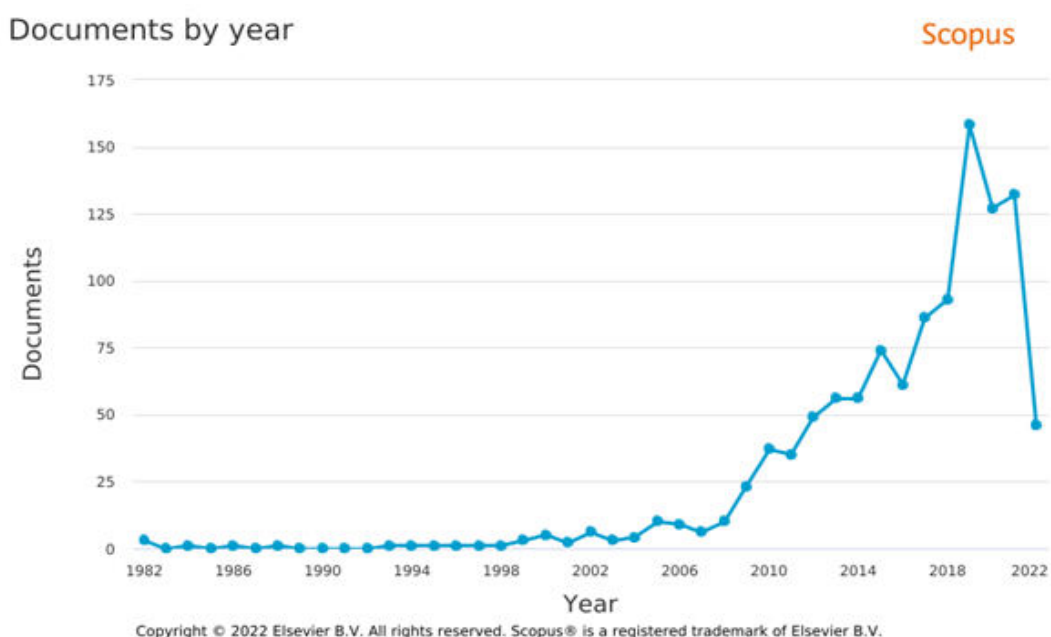
RESULTS

General Description of Employability Skills Research

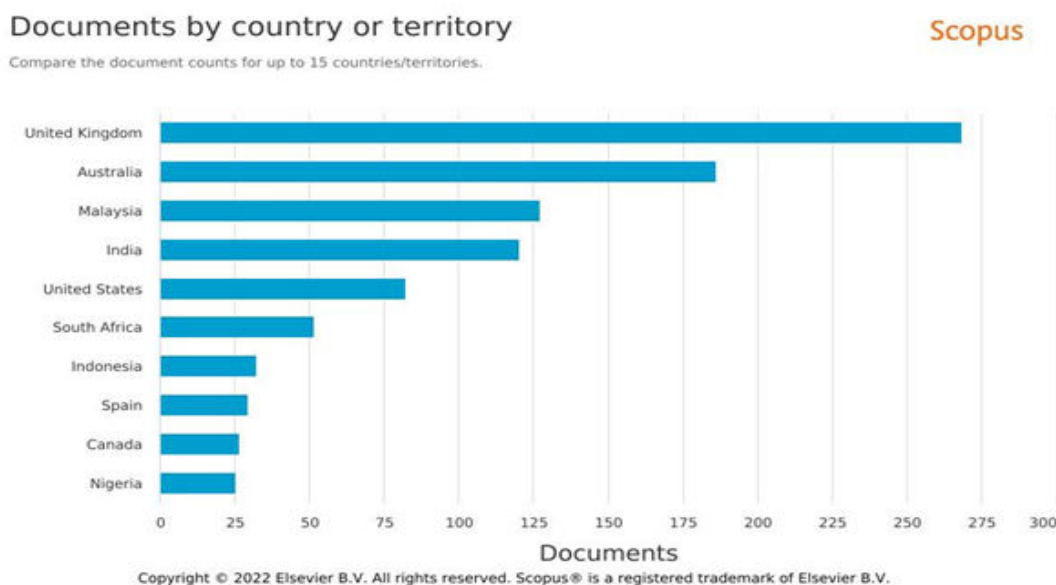
Figure 3 depicts the production of publications per year. The publication of employability skills starts in 1982, but the publication is minimum till 2006, after it the production is increased after 2018 the number of publications is fallen drastically.

Figure 4 shows the production of publications country wise; the United Kingdom is on the top that is followed by Australia and Malaysia 175 and 125 publications respectively. However, Nigeria and Canada are on least in the production of employability skill publications.

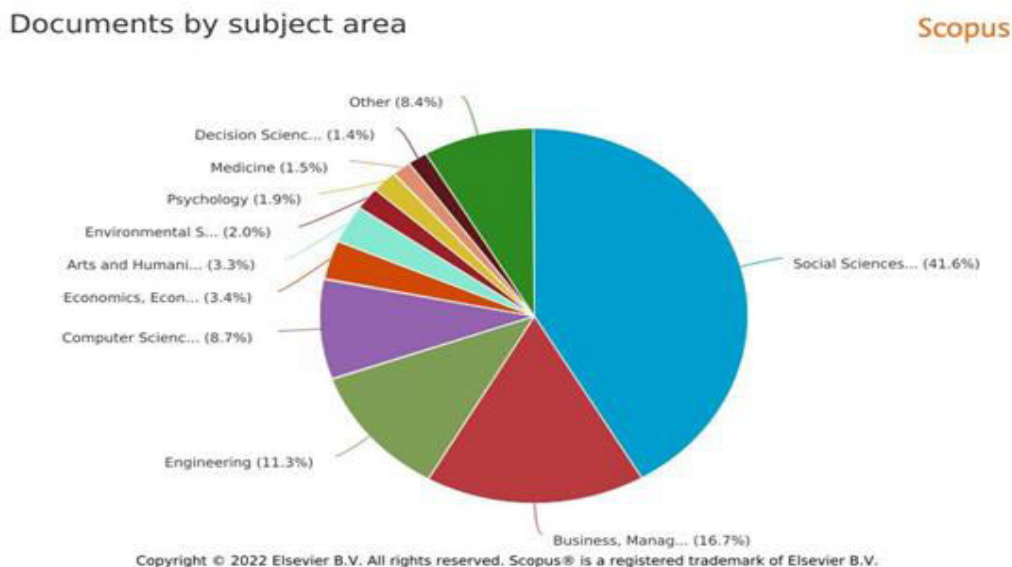
Figure 5 represents the % of total publication subject area wise. Among all of the social science is at the top with 41.6% of publications that is followed by the business finance and accounting with 16.7% of publications. Furthermore, other areas such as medicines psychology and decision science.



(Figure-3 visualisation of output per year of employability skills)



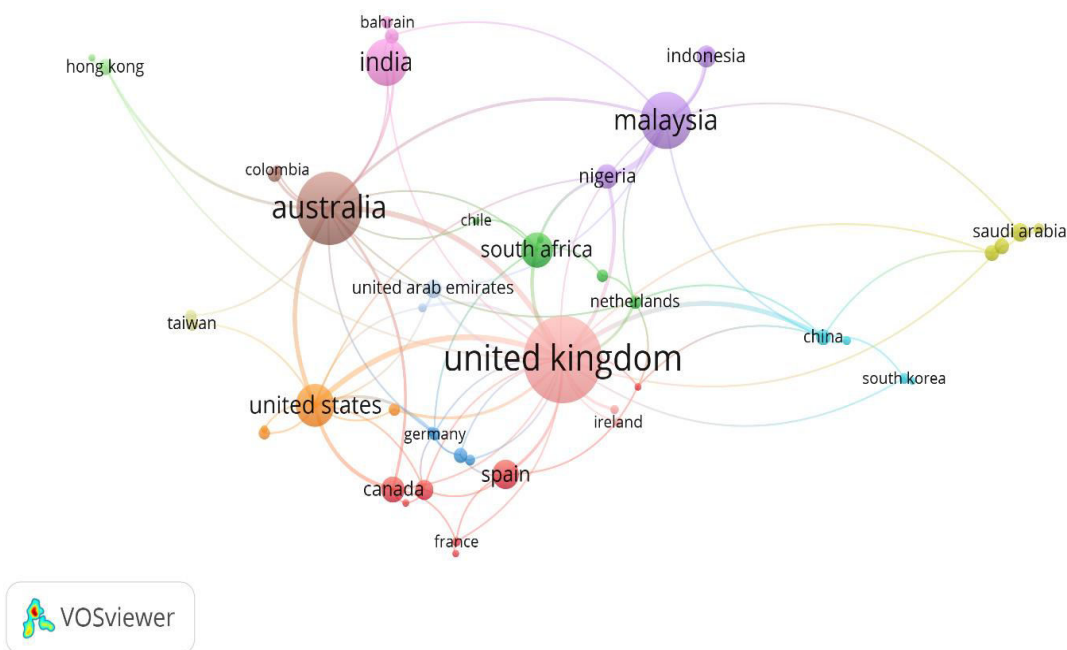
(Figure-4 Visualization of country-wise production of the publication)



(Figure- 5 Visualization of discipline in conducting research in employability skills)

Co-Authorship Analysis among Countries

Figure no. 6. Depicts the co-authorship network among countries. The United Kingdom is the most collaborated country with 227 documents, having links with 25 countries, followed by Australia, which unites with 15 countries. to analyze the objective, we chose co-authorship as analysis. The unit of analysis was “country”, with a minimum of two documents. Out of 82 countries, 57 meet the criteria. But the link strength was not, so the final solid result consisted of 54 countries.

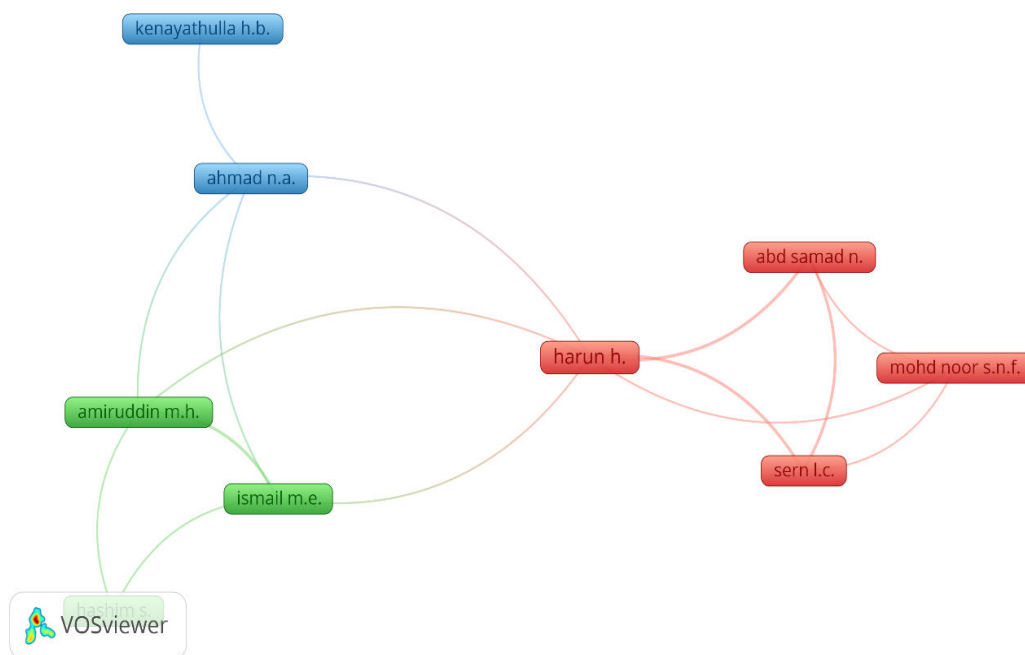


(Figure 6: Visualisation of Co-Authorship Network Among Countries)

Co-Authorship Analysis among Authors

Figure no. 7. represents the collaboration of authors in researching employability skills. The analysis showed three clusters, red, green, and blue, indicating that the author falls in the same cluster that collaborated most in this research field.

To analyze this objective, we chose a unit of analysis, “author,” with a minimum of 2 documents. One hundred ninety-seven meet the requirements, but Vos viewer eliminated all of the authors except nine. The reason is that total link strength is not so muscular.



(Figure: 7. Visualisation of Co-Authorship Network Among Authors)

CONCLUSION

Employability skills are the personal and interpersonal qualities and are also known as people skills, soft skills, core skills and much more (Robles & Marcel, 2012). A person requires various skills to make them work/career ready. These skills needed at diverse stages of life might vary as it depends from individual to individual and situation to situation. However, individuals' skills to make them in demand for a job might be called employability. Although, the foundation of the term "Employability" might not be dated correctly as the apprehension for "employability" that has been taken place since the earlier century, which is something related to employment issues. Employability skills are those skills which need to be a part of an individual all through his lifetime. This is one of the reasons for various persons to retitle sometimes the "employability skills" as "life skills".

Ayoubi, R. M., et al. (2017) highlighted the importance of social, public & interpersonal skills, as no one can work alone, so one must be interactive and friendly with others. Messer (2018) concluded that timekeeping and professionalism skills contributed to the success of one's career. Studies showed the employer's perspective on the most important factors are; communication, leadership, professionalism, learning skills, commitment to the job, work experience, motivation, decision making etc. and the critical factors from the students' perspective are; domain knowledge, basic & analytical skills, management ability, technical skills, willingness to learn etc. Some studies also recommended enhancing students' curriculum as per the requirement of today's jobs (Robinson, et., al. 2007; Silva, A. P., et., al. 2013).

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Assessment, Impact and Control of Polluted Soil Due To the Mining near Lalmatia Coal Mine Area of Godda District in Santal Pargana, Jharkhand

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ABSTRACT

Economic activity in the area of coal mines but soil quality leads to degradation operations of open-cast coal mining, involving large amounts of rock mass and overburden materials to coal execution for many purposes. Soils were impacted by various operations in coal mining, including storage, drilling, blasting of overburden dump materials, and construction of ancillary facilities, vehicle movement, and land clearing. Various wastes, such as organic substances, inorganic substances, toxic materials, and heavy metals, are released from various processes and operations of coal mining. The proposed study was conducted in January 2022 in six sampling locations in the Lalmatia coalfield, Godda District, Jharkhand State, India. This research study revealed significant variation in physical, chemical, and instrumental parameters of wasteland soil due to coal mining operations. From this research paper, obtained information helps in knowing about the soil quality status in the Lalmatia coalfield, Jharkhand state. This research paper focuses on soil characterization and will discuss the significance of these parameters; bulk density, conductivity, pH, specific gravity, organic matter, organic carbon, alkalinity, nitrogen, chloride, phosphorus, potassium, and moisture content and to analyze heavy metals.

INTRODUCTION

- In India, the source of dominant energy is coal, and the plants that use thermal power fuel use coal as well.
- The coal's major portion is of low value.
- Being low calorific and low quality coal.
- The coal reserves available in India are sufficient to meet our needs for at least another 100 years.
- In India, most of the production of coal comes from open-cut mining.
- Which accounts for over 80% of the total production.
- Coal mining operations are only economically viable when the coal seam is near the land surface. Open-cut mining not only destroys the use pattern of existing land vegetation, water quality, and air quality.
- But there is also a topsoil loss, in either a biological or pedagogical sense.
- Open-cut mining activities such as transportation, drilling, and blasting of coal materials have not only changed the look of areas adjoining mining.
- Also left toxic traces and inorganic substances on the system's soil.
- Large amounts of waste mining materials from operations of coal mining on land used for agriculture destroy, because delays in ecological plant succession and local biodiversity affect the Lalmatia coalfield.
- Soil is not handled selectively in the Lalmatia coalfield because topsoil material results are mixed with rock mass overburden from coal mining operations, and thus the fertility of soil land management, an important resource, is gradually lost.

AIMS AND OBJECTIVES

- ☐ These investigations main objectives were to assess the various physico-chemical parameters such as
- ☐ Bulk density,
- ☐ Conductivity,
- ☐ pH,
- ☐ Specific gravity,
- ☐ Organic matter,
- ☐ Organic carbon,
- ☐ Alkalinity,

- Nitrogen,
- Chloride,
- Phosphorus,
- Potassium,
- Moisture content
- To analyze heavy metals by atomic absorption spectroscopy in six village's waste lands nearby the Lalmatia coalfield.

2: MATERIALS AND METHODS

Study Area

- ❖ The Lalmatia coalfields are one of the higher Gondwana coalfields of India, covering an area of about 400 ha.
- ❖ Eastern Coalfield Ltd is one of the most important coalfields in India, located in Lalmatia, Godda District, between latitude 24°54' N and longitude 87°17' E.
- ❖ The Eastern coalfield is about 130 acres in length and approximately 14 km in width.
- ❖ It stretches from west to east and finally turns southward, covering an area of about 450 sq. km. India's only source of high-quality coking coal is the Lalmana coalfield in Jharkhand.
- ❖ The coalfield has been a centre of activity for coal mining for more than a century.
- ❖ The maximum average temperature during January is about 24°C, and the minimum average temperature is about 26°C during December.
- ❖ A total of six sites were selected in the Lalmatia coalfields, i.e., Neema, Bagjori, Janakpur, Kendua, Hijukita, and Jatakothi village's wastelands.

2.2: Collection of Samples

- In the present study, about six wasteland soil samples were collected from the six villages around Lalmatia Coalfield in Godda district during the month of the winter season.
- They collected samples in clean polythene bags, packed properly and carried out the analysis in the Department of chemistry, SKM University, Dumka, Jharkhand.
- The collected soil samples were cleaned, crushed, air dried, and 2 mm mesh sieves passed through and analyzed in the laboratory, carried out studies for pH, bulk density, electrical conductivity, specific gravity, organic matter, organic carbon, alkalinity, available nitrogen, phosphorus content, potassium content, chloride content, and heavy metal content.

2.3: METHODOLOGY

- The determination of moisture content by the gravimetric method is expressed as a percentage.
- The gravimetric method was also used to determine bulk density, determined by electrical conductivity and pH using an ELICO-CM-180 conductivitymeter and an EQ-650 pH meter, respectively.
- Organic matter, organic carbon, nitrogen, phosphorus content, carbon content, potassium content, chloride content, alkalinity, bulk density, and specific gravity were determined by the Handbook of water, air, and soil analysis as provided by Chaurasiya and Gupta, 2014, heavy metals analysis on a Shimadzu-AA 6880 series AAS analyzer.

3. RESULTS AND DISCUSSION

- In the present pH study, wasteland soil samples were lower.
- PH was measured in Neema village (5.84) and Bagjori Village (6.72).
- The primary nutrients, such as potassium, nitrogen, and phosphorus, and also the maximum availability of secondary nutrients like magnesium, calcium, and sulfur, are found in the 6.50–6.75 pH range (Ghosh *et al.*, 1983).
- Low pH at Neema (5.84), Janakpur (6.18), Hijukita (6.16), and Jatakothi (6.00) village's wasteland soil samples.

- On the basis of pH values of the above mentioned villages wastelands, plants cannot utilize K, P, N, and other required nutrients.
- In acidic soil, plants are more likely to absorb toxic metals, and some plants eventually die of toxicity.

Conductivity

- The electrical conductivity of soil salinity and the ability of aqueous solutions to carry electric current are both measured.
- During the study, they discovered electrical conductivity ranging from 0.36-0.40 mΩ/cm in the wastelands of six villages surrounding the Lalmatia coalfield.
- If the soil conductivity is in the range of 0.2-0.8 mΩ/cm, then this soil is essential for plant growth.
- So, in view of this, all soil samples from wastelands are useful for plant growth.

Bulk Density

- Weight measures the soil per unit volume by bulk density, usually on a dry basis in an oven.
- Soil sample bulk density depends on the structure of the soil, texture, and status of organic matter in the soil, and it varies from one site to another.
- Wasteland soil samples' bulk density was found in the range of 0.78-0.99 g/cm³
- The wasteland of Hijukita soil sample had a maximum bulk density of 0.99 g/cm³, and the minimum bulk density was found to be 0.788 g/cm³ for Janakpur village waste land.

Estimation Of Heavy Metals In Soil Samples

- The analytical data of the heavy metals analysis for the Lalmalia Coalfield wasteland soil samples, As, Cd, Cu, Ni, Pb, Zn, Mg, Co and V are not detected on AAS instrument.
- The concentration of Cr and Fe ranged between 0.1185-0.1568 and 0.02-0.43ppm, respectively.
- The highest concentrations of Fe and Cr were found in the waste lands of Neema village, with Cr concentrations exceeding the Bureau of Indian Standards (BIS) soils guidelines at approximately 50% of the sampling sites.

CONCLUSION

- It has been found that continuous activities of coal mining in the Lalmatia coalfield have posed a serious threat to the environment in several ways by generating waste from coal mining.
- The waste from coal mining causes pollution very seriously in soil quality terms and long-term disasters are caused to the natural ecosystem.
- Specific gravity, bulk density, conductivity, and moisture content have been found moderate in the range of growth of plants in the wastelands of the Lalmatia coalfield.
- In the wastelands soil samples of Neema, Janakpur, Hijukita, and Jatakathi villages, pH, specific gravity, organic matter, and organic carbon have been found above moderate levels.
- From the above discussion, it can be concluded that the evaluated wasteland soil samples in this study cannot be found environmentally safe for agriculture purposes, plantation, and vegetation.

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Marlon James's Queer Perspective on Woman's Heterosexuality in a Brief History of Seven Killings

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ABSTRACT

This article examines Marlon James' 2014 novel *A Brief History of Seven Killings*, which presumably presents his queer perspective on women's straight sexual orientation through a female character named Nina Burgess. Burgess, the main female character, has to go through a lot of trauma in her life as a heterosexual woman because of her sex and gender. A lot of her suffering comes from being a typical Jamaican teen girl. Using Burgess as the primary research subject, James will use her traumatic experiences to show his perspective on heterosexual women. Burgess is compared to another character (the gay gang member Weeper). The analysis's findings are contradictory; when viewed from a feminist perspective (a woman's perspective), the novel appears to depict Nina Burgess' positive transformation from a helpless individual to an independent woman. However, a queer interpretation of her transformation reveals something else: she is dissatisfied in her new role as a straight woman. While her transformation frees her from men's fearful dominance, it is unable to provide her with the psychological comfort and happiness she craves, so she begins to lose interest in men. According to the author, Burgess' sexual dissatisfaction shows James' way of questioning women's sexual choice.

Keywords: Female characters, metamorphosis, queer theory, straight woman, homosexuality.

INTRODUCTION

"The goal of Feminism, Queer Theory, and Contemporary Fiction is to contribute to what Richard Johnson calls the "impetus to render heterosexuality visible to critical scrutiny." As an institution, heterosexuality continues to wield enormous normative power; while this power primarily affects non-heterosexual identities, it also extends to heterosexual identities that do not adhere to traditional familial, marital or reproductive norms – standards that have a disproportionate effect on female identities, the focus of this paper . Rereading *Heterosexuality* draws on feminist and queer theories of sex, gender, and sexuality to examine the representation of female identities that are at odds with heterosexual norms; more specifically, it examines representations that serve to challenge the conventional equation of heterosexuality, reproductive sexuality, and female identity. Twenty-five countries around the world have officially recognised homosexuality and legalised interracial marriage (Perper, 2017).

Homosexuality is still considered abnormal in many countries and cultures, despite the fact that it is becoming more widely accepted. As a result, it encourages homosexuals to make a point of publicising their identity. Marlon James is one of the well-known public figures who has come out as gay. At the time of his mid-thirties sexual orientation struggle, he said in an interview that it was difficult for him because being gay in Jamaica was a criminal offence (Oppenheim, 2016). After leaving Jamaica at the age of 37 as a gay man, he went on to win the Man Booker Prize for his novel *A Brief History of Seven Killings*, in which he shares his thoughts on sexuality with his readers. The Man Booker Prize-winning novel *Brief History of Seven Killings* (2014), about the 1976 assassination attempt on Jamaican superstar reggae singer Bob Marley, is best known as a contemporary work of criminal fiction. When people talk about this book, they primarily talk about the violence, which is understandable given how prevalent violence of all kinds is throughout the book. However, the numerous gruesome scenes that can be found in the novel will not be examined in this article. It focuses on the struggle of Nina Burgess (the novel's female main character and the only female narrator among eleven narrators employed in the novel) to free herself from male fearful dominance, which results in the apparent positive transformation of herself as a woman.

Nina Burgess appears to be a representation of a small part of the female voice. Yet, she is the only one to make it to the end of the storey unscathed. One of the ways she manages to survive is by transforming herself from a helpless woman into an independent one. Readers may interpret Burgess' personal transformation as an appreciation of the struggles she has faced in her life. Despite being alone and lonely in a dangerous world of crime, she manages to hang on and becomes financially independent. Looked at from a distance, it appears the author feels sorry for Jamaican women. Closer reading, as demonstrated in this article, yields a completely different conclusion: Burgess is unhappy with her lot in life and suffers from sexual oppression and depression as a result of her gender identity as a straight woman.

After she matured into a strong, self-reliant woman, it is discovered that her painful past now makes her wary of entering into a relationship with a man. James is suggesting that heterosexual women should reconsider their sexual orientation identity by contrasting her difficult situation with the luxurious homosexual lifestyle of a gay gang member. Homosexuality should be considered as an option if a woman chooses to remain heterosexual. According to Dillon, Worthington, and Moradi, "identity is a stable sense of one's goals, beliefs, values, and life roles." Sex and gender are just a few examples of what's included in this category (2011, p. 649). Her identity is still unstable, according to the results of the investigation. She hasn't made up her mind about her decision yet. The following discussion explains why urgers's transformation is a failure and why she should reexamine her current sexual orientation identity.

METHODOLOGY

This is qualitative research in that it deals with non-numerical data and has interpretive characteristics. It analyses the data using a content analysis method. According to Krippendorff (2004), qualitative approaches to content analysis are "...sometimes labelled interpretive" (p. 17). Ratna (2008) goes on to say that this method has two parts; contents, both latent and communicative. Latent content is what the author had in mind when writing the text, whereas communication content is what comes out of the interaction between the text and its audience (p. 48). The focus of this study is on women's representation, particularly in the novel *A Brief History of Seven Killings*. Specifically, the data come from the narratives under Nina Burgess' point of view (including pseudonyms Kim Clarke, Dorcas Palmer, and Millicent Segree) about herself as a woman and from the viewpoint of Weeper about him being a gay gang member, where James perspectives on womanhood, heterosexuality, and a same-sex relationship are reflected in the narratives. Because the interview with the author was omitted from the data, this study must rely solely on the interpretation of information found in the novel.

Here Elaine Showalter's feminist critique theory is used to decipher the data. Showalter's theory, according to Newton (1997), emphasises "... woman as consumer of male-produced literature." The hypothesis of a female reader alters our perception of a text, bringing to light the significance of its sexual codes, and the images and stereotypes of women in literature, as well as the omissions and misconceptions about women in criticism, as well as the cracks in male-constructed literary history. It's also interested in the exploitation and manipulation of female audiences, particularly in popular culture and film, as well as the analysis of the woman-as-sign in semiotic systems" (p. 216).

RESULTS AND DISCUSSION

The fact that most women were born with a female body makes them believe that they should be sexually attracted to men, which is what is considered normal in many cultures. Marlon James' *A Brief History of Seven Killings*, which depicts the thoughts of seven Jamaican women, makes a similar point. Nina Burgess, her sister, and a slew of other females put forth considerable effort in order to entice men. Because the storey is set in Jamaican slums and at Bob Marley's mansion, where young people can party from afternoon until morning, the relationship between a man and a woman is largely one of physical attraction. To put it another way, women are valued primarily for their arousal potential as sexual objects. Intellectuality? They don't need it. in social constructionist accounts where sexuality always reflects normative gender expectations, the complexity of sexual feelings and desires tends to be underplayed" (p. 443). These women want to position themselves as men's sex partners in order to live up to society's expectations of what constitutes a "normal" sexual orientation identity. The problem is that men are inherently dominant and expect women to be submissive in exchange for their dominance and respect. Burgess has long been concerned about the unequal power relations that exist between men and women. she thinks that women should avoid going to Jamaica because it is dangerous for them. Her awareness of the dangers of living in Jamaica is expressed in the following thought: "It's not the actual crime that makes me want to leave, it's the possibility that it could happen at any time, even in the next minute now." If it never comes, the point is that I'll be waiting for it, and the wait is just as bad because you can only do one thing in Jamaica: wait for something to go wrong" (James, 2014:103). When Burgess uses that quotation, he's referring to crimes that frequently include rape if a woman is present. As a result, she exerts every effort to leave Jamaica as soon as possible. Her goal is to get to New York City.

Changes in the Subjectivity of Women

Nina Burgess goes through a series of aliases to keep her true identity hidden from gang member Josey Wales, who is after her after she witnessed his murder attempt on Bob Marley. It is Nina Burgess, however, who tells her storey in the first narrative. When Burgess learns that Bob Marley doesn't remember her name despite spending the night with her and penning a song about her, she realises that women may be losing their self-respect as a result of men's dominance (pp. 46, 48). She was certain they were in love. She thought she was

unique among Jamaican women for having sex with Bob Marley simply because of his fame. Regrettably, Burgess erred in his assumptions. Marley has no feelings for her at all. After that night, he forgot about her and never called her again. Burgess is simply being too depressed to believe she is unique, whereas for the singer, she is no different from any other woman: a female body, a sex object. Burgess, on the other hand, is wise enough to understand that women should not put up with men who treat them disrespectfully. She is always cynical about women who only value their physical attractiveness and believe that the best achievement in life is to marry a wealthy man (pp. 45-46). The fact that so many girls want to be Miss Jamaica or take part in other beauty pageants for the chance to marry wealthy men makes her desperate (pp. 310-311). However, she has no other option but to be rude to those around her in order to combat the sexually oppressive environment. "If you're going to rape me, rape me already and leave me in whatever ditch" (p. 124) is what she tells two policemen who exchange codes to rape her while giving her a ride home one evening after curfew. Despite the fact that her rudeness successfully foils their scheme, she is still in grave danger. Burgess's life as an adult woman comes to an end with these events; she is now voiceless.

Unfortunately, she won't be able to do much better now that she's come to terms with her predicament. She's powerless against the system on her own. As a result, her only option is to leave Jamaica in search of a more suitable place to live. In the end, her efforts to obtain a passport have the opposite effect and have made her life even more difficult. She assumes the guise of Kim Clarke and becomes an American expatriate's mistress, and she is ashamed of herself for having lived with a man who did not truly love him in the hope that he would take her back to the United States with him when he returned. That's not going to happen because he views her as nothing more than a source of amusement while he's separated from his wife. The worst part of Burgess's experience is agreeing to have sex in his office with a notary public officer because that is the only way he will give her the passport (p. 292). There is no time in Burgess' life when he is not subjected to the natural dominance of men, who see attractive women as prey. But one thing is for certain: she is now reaping the benefits of her physical attributes. The woman has changed her mind and no longer allows herself to be raped by any random criminal on the street. Although being a mistress will make her a pariah, she will be able to afford a decent place to call home. Additionally, she has the opportunity to save some of the monthly living expenses that Chuck provides for her. If she wants to apply for a passport, she'll need cash. Burgess has given up on remaining silent at this point. She refuses to celebrate the oppression of women passively by taking an active role in her life. She's made up her mind to leave her home country of Jamaica and take any opportunity she can get. She's now on a mission to find her own unique voice.

Burgess (a.k.a. Kim Clarke) travels to the United States with her passport in hand and takes the guise of Dorcas Palmer. She takes on any job to help support herself and be self-sufficient. Even though she's in the United States, she's still plagued by the memory of Josey Wales. So, when Burgess (a.k.a. Kim Clarke, a.k.a. Dorcas Palmer) learns that some Jamaican gang members are planning to expand their business in the United States, she changes her identity yet again to become Millicent Segree, a professional nurse with a certificate she obtained from evening college courses. Unfortunately, Josey Wales, a symbol of patriarchal oppression, seems to follow Burgess (or so she believes) wherever she goes. Being a free woman with control over her own body and life seems like an impossible goal for Burgess at this point in her life. Because she is the only living witness to Wales shooting the Singer at his house, his presence means the death penalty for her. He will hunt her down to ensure she keeps quiet. Her desire to live freely, on the other hand, is far greater than her apprehension. Burgess' multiple disguises in this case can be interpreted as a strategy for surviving and resisting men's oppressive dominance.

Her experience as Millicent Segree demonstrates a higher level of flexibility in dealing with adversity. We've seen her progress from a woman with her own "room" to one who is financially independent (Woolf, 1929, p. 9). She is the one in charge of her own destiny, and she makes all of the decisions in her life. She's a much better person now that she's reached this point. She broadens her horizons by enrolling in night classes at a medical college in order to land a better position. She is a nurse in a medical facility. However, her job as a nurse forces her to revisit the trauma of being shot by gang gunmen when a group of Jamaicans is brought to the hospital where she works one night with fatal gunshot wounds. Because of this, she's reunited with Josey Wales once again. What matters right now is how Segree handles her anxiety. She is better equipped to deal with her feelings now. "NO MORE DRAMA...", she exclaims. Nothing to do with kass-kass, entanglement, disagreement, or conflict is what I desire. "I'm not even interested in watching drama on television anymore" (p. 613). She has a strong sense of purpose in life, and that drives her to be tenacious.

Burgess' life story shows her transformation from a mere sex object to an independent woman. Freedom from man's control and increased personal independence improves the quality of her life. James portrays her as a

victim who has transformed beautifully and taken control of her own body. Is it up to par? It's true, it's true. It appears as if there is genuine concern for Burgess' well-being. Is she, however, content? This still needs to be clarified.

Straight Woman: Can She Truly Be Happy? Can a Straight Woman be Truly Content?

Nina Burgess is a complex character, well-developed by Marlon James. This woman's ability to survive and transformation into a woman who has control over her own identity is stunning. The fact that the novel's sole female narrator is present does not diminish her significance. As a figure of hope and strength for female readers, Burgess must be reimagined by them. But why does she seem upset? What is it about her life that makes her unhappy? Are you asking because of her fear of Josey Wales, or is there something else at play? Burgess's unhappiness is most likely tied to her upbringing in Jamaica, where she was subjected to a lot of sexual abuse.

A person's social identity in relation to the body has been constructed by many cultures as sex as a person's biological identity (whether one is born a male or female), with all the social expectations that follow it. individual's sexual desire behaviour is determined by their sexual orientation identity. They say that a person's sexual orientation identity is defined as "...the conscious recognition and internalisation of one's sexual orientation" (p. 650), whether they want and feel affectionate arousal to people of the opposite or same sex, or both. Burgess is described as a "normal" young woman who is also straight. Four years ago, she had a boyfriend who she dumped. She was reportedly single and had no romantic relationships until she met Bob Marley at a party and spent the night with him. She believed she adored and loved him, and she had marked the time they spent together as a special one in her memory. But despite her refusal to consider changing her sexual orientation, James' narrative indicates her desire to be removed from man-woman relationships.

She becomes an antisocial recluse because she is the only one who witnessed Bob Marley's assassination attempt and so is the murderer's prime target, Josey Wales. Her lack of interest in socialising could be interpreted as a rejection of getting romantically involved with a man.

It dawns on her one day that the Singer has no recollection of her at all, and she realises that she has made a blunder. Because you let him into your underwear, people will assume you know him or that you've unlocked some sort of mystery" (p. 32). As a result, her life as a mistress of Chuck, a white man, is a disgraceful one. Chuck uses her as a temporary distraction from his wife. She has to keep coming up with new reasons to like Chuck, to fall in love with him, so that having sex with him isn't such a drag. To escape romantic and emotional attachment, Burge starts to see sexual relations as nothing more than a game that can be played. Tyson (2006) goes on to say that a person's sexual behaviour is heavily influenced by their sexual orientation identity. However, from a queer point of view, this is not a permanent condition.

As a result of deconstruction's insights into the fluidity, fragmentation, and dynamic collectivity of possible "selves," queer theory defines individual sexuality as a fluid, fragmented, and dynamic collection of possible sexualities... Because sexuality is a dynamic range of desire, our sexuality can change over the course of our lives, or even over the course of a week. For all of us, homosexuality, lesbianism, bisexuality, and heterosexuality are options on a spectrum of sexual orientations. On page 335, the author writes, "

Can Burgess' sexuality shift from heterosexual to lesbian or bisexual as a result of her traumatic past and heavy present?

In other words, "sexual orientation refers to an individual's patterns of sexual, romantic, and affectional arousal and desire for other persons based on those persons' gender and sexual characteristics," while "sexual orientation identity is what we term the individual's conscious recognition and internalisation of sexual orientation." An individual's community, social support, role models, friendships, and partner(s) can be shaped by their sexual orientation identity, according to research (pp. 650-651). As a child or elderly nanny for a company, Burgess' sexual orientation identity is tested to the limit. It's hard for her to see an elderly white man walking around naked when she's caring for him. When you live with a man, there will come a time when he will begin to believe that he can go around naked. The first time he did it, I could tell he was hoping I would be surprised, but all I saw was yet another elderly person to nurse... and after the seventh time, I started laughing so hard I hiccuped" (p.442). According to the preceding quote, even though it has been years since she had a romantic relationship with a man, seeing a scene of a man walking around naked is nothing to her. Because he's old and unkempt, that's most likely why. However, when she arrives at her agency, she tells the manager: "...while I will scoop up any load of shit, I'll have nothing to do with a withered white pen*s" (p. 442), which shows her commitment to only focus on her work and never play with sex.

Burgess has made it a priority in her exodus from Jamaica to remain single. She is aware that "...if you ignore men, they will go away" (p. 443). But one night, because she was missing Jamaica so much, she went to a Jamaican club, where she met several Jamaican men. Being alone and lonely in New York may be an easy reason for her to establish contact with a man from her native country. She was approached by a man who appeared to be former professional French tennis player Yannick Noah. The two struck up a conversation about numerous topics. After Burgess had passed out, he got up and left. However, before he left, he left his phone number on the dresser next to the door. If she calls him later, Burgess will at least have someone to talk to, even if it's just a friend. She isn't. She never thinks about it, but she has this funny thought: Although I expected to be offended, a part of me was hoping for at least fifty dollars to be under the note (p. 444). Burgess has lost her ability to be seduced by a man. For some reason, romance does not hold the same allure as monetary gain. She closes her heart and is content with her current situation as a single woman. A man will never again be a desirable partner. A person's sexual orientation identity is connected to a variety of relational and interpersonal factors, say Dillon, Roger, and Moradi. To avoid being sexually dominated and intimidated, Burgess unwittingly loses interest in people of the other sex group. As a result, she no longer attends parties or cultivates romantic relationships with men.

The struggle continues when she is tasked with caring for yet another elderly man. This time, it's an elderly man with schizophrenia who looks like Lyle Waggoner (p. 444), a Mr. Colthirst, and who doesn't understand why he needs a nanny. In his pink chinos and white polo, Mr. Colthirst shows off his muscles so nicely that Burgess suspects that Mr. Colthirst might be gay (p. 478). Burgess is still trying to put up a barrier between them, as she tells Dorcas Palmer that "[a] smile from a man is a down payment. Don't try to sell him anything (p. 532). In contrast, Mr. Colthirst's friendship with Burgess develops beautifully because Burgess is made to laugh and feel at ease by his humour. When Mr. Colthirst gets bored at home, they get together to have a drink on the street, and eventually they end up at Burgess' apartment. Burgess is nervous because she dislikes having a man in her house (p. 532). "I said it was my house, and nobody gets to speak louder than me in me damn house," she tells Mr. Colthirst when he starts showing dominance and feeling at home (p. 558).

When it comes to Mr. Colthirst's eccentricities, Burgess has a lot of fun. He's unconcerned about Burgess's past and can treat her like a friend. Burgess almost completely trusts him after hearing his version of events from the past. She appears to be thinking about how nice it would be to have a friend she can rely on, but not in a romantic sense: "But if he thinks this night will end up like a French comedy with me in bed... and him smiling contentedly as he smokes a cigarette, he just made one sad mistake," she said (p. 532). What are the chances that Burgess will ever date again? It doesn't appear that way. The plot of the novel reveals that she psychologically eliminates any possibility of falling in love with a man. Her sexual desire and her heart both go cold.

The novel, on the other hand, depicts a passionate sexual encounter between two men in great detail. Gang member Weeper, who is assumed to be straight, gets help from a white gay man to figure out his sexuality. He's taken aback at first by the sensation of being the one being explored (rather than the one in control), but he soon gets used to it. It's not uncommon for him to enjoy being explored by his male partner because he's part of an aggressive gang. All he cares about is "...nobody can see but the sky" (pp. 499- 502).

When it comes to discussing the representation of gay and lesbian people and characters in literature, Tyson wrote in her book more than a decade ago that critics and scholars have largely avoided bringing up the topic because they do not want to confront the authors' open homosexuality (p. 318). Compulsory heterosexuality is still the rule in most cultures. Families and religious institutions like school and church put a lot of pressure on young people to be heterosexual in order to be considered normal (p. 320). Unlike other women who are supposed to be heterosexual, Burgess stops exploring her sexuality when she

becomes a „normal” woman who is heterosexual. She simply avoids being in any kind of woman-to-woman relationships. Her heart is numb because being heterosexual is only a physical and psychological burden for her. Despite the fact that she isn't as extreme as Weeper, who has dared to interact with the homosexual community and is currently engaged with one of them, Burgess' current state shows that she is beginning to doubt the necessity of remaining heterosexual as a woman. She's probably developing a new sexual identity at this point. According to Dillon, Worthington, and Moradi, "identity formation consists of becoming aware of one's unfolding sexual orientation, beginning to question whether one may be GLB, and exploring one's emerging GLB identity by participating in gay-related social activities and/or sexual activities" (in Rosario et al, 2006, p. 2). Burgess, in contrast to Weeper, refuses to engage in any kind of sexual relationship with a man because she is re-evaluating her sexual identity.

CONCLUSION

Nina Burgess, as depicted by by Marlon James, is a complex woman dealing with a variety of issues in her life. After carefully examining her personality, it's clear that her efforts to combat male dominance and intimidation have a deeper meaning. The first is that it represents a growth in women's subjectivity. In the process, she's gone from being a sexual object to becoming an independent woman. A sympathetic representation of women, this transformation appears to be. To look at Burgess' character again reveals an entirely different picture; she has failed because her transformation has not brought her happiness. Because of the traumatic sexual oppression she has endured in the past, she is perpetually unhappy and depressed. Being a heterosexual woman, or a straight woman, has only brought her misery. As a result, she is unable to be in a relationship with a man. Her sexuality was firmly entrenched in its heterosexuality. Despite the fact that she does not become a lesbian in the novel, her choice to remain heterosexual now appears dubious. James appears to hint to Burgess that there is another option by presenting Weeper's joyful exploration of a homosexual relationship with a gay. Marlon James is, in a way endorsing homosexuality in this book.

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To Study the Challenges and Opportunities of Wellness Tourism and Its Effect on the Hospitality Industry India in Covid-19 Pandemic

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ABSTRACT

In today's stressful life, all the citizens are busy in battle of success, where all the people are suffering from negativity to their emotion, health and mental state. The citizens decides to travel, to get a breath of relief, nonetheless, travelling makes to not only unhealthy but also overeating, poor sleeping, disturbing of fitness schedule, and stress of travel which leads 'unwell travel Henceforth, people strive for wellness tourism, which revitalizes tourists, provides very authentic experience, comprises not only healthy eating but also staying as well as unites oneself through soul and god. The term Wellness tourism can be described as entirely travel accompanying with the detection of uphold or improving one's personal prosperity. The major goal of this research is to review the occurrence and development of wellness tourism and to explain its contemporary position. Assuredly, industry of wellness tourism, in era of pre-COVID-19, was very well established everywhere the in globe. Wellness tourism is a division of health tourism which has been considered as a foremost instrument to bring the health to the tourists. This business made it conceivable for people to animate healthily as well as peacefully. This business, consequently, still lures momentous consideration amongst stakeholders of tourism. This research discovers the influence of COVID-19 on tourism of wellness in India. Across, the globe, COVID-19 has fetched almost modifications in numerous ranges. The major aim of this research is to assess the impact of COVID-19 on tourism of wellness in India. This paper describes about the perception of wellness tourism, mechanisms as well as global opinion of wellness tourism through the provision of connected reports, articles as well as secondary data. This work of research accomplishes that the opportunities and challenges of wellness tourism post-pandemic in India as it is tremendously vulnerable.

Keywords: Wellness tourism, peace, healthy, COVID-19 pandemic

INTRODUCTION

Tourism is one of the leading as well as rapidly developing businesses in the globe. Wellness tourism is gaining an upper hand all other types of tourism industry throughout the globe. Wellness tourism fascinates the richest vacationers from developed as well as developing countries. It rises the economy of not only developed nations but also very small or underprivileged areas, which on the other hand are great in orthodox or conventional approaches of healthiness and wellbeing. The primary principle of search for wellness is the enhancement in healthiness, which spontaneously takes to an improved quality of health. Numerous wellness programs purposes to eradicate the not only physical 'toxins' but also intangible 'toxins' from an individual concluded the usage of relaxation techniques as well as de-stressing techniques. Thus, centers of wellness as well as retreats inspire for upholding a healthy lifestyle because of fitness-related activities as well as a nutritious diet. Wellness tourism also highlight mental and spiritual health, treatments of beauty enhancements as well as techniques of healthy sleeping all in the faith of cultivating as well as developing one's healthiness. Wellness tourism can be defined as travelling for the purpose of health as well as well-being. Wellness tourism is describes by DRI International as 'all travel related by the quest of retaining or improving one's individual wellbeing'. The economy of wellness tourism comprises altogether expenses that tourists make throughout a journey to enhance or uphold their wellbeing. Wellness tourism can be described by the Global Wellness Institute as the market into two categories of travelers, which are Primary wellness travelers and Secondary wellness travelers. Primary wellness travelers can be termed as individuals who are predominantly encouraged by wellness to go for a journey. The journey's end place of these travelers is centered on its providing of wellness services. A case in point would be somebody taking the services of a yoga treatment in the wellness resort. Secondary wellness travelers can be termed as individuals who want to uphold wellness or take part in activities of wellness throughout any type of journey. A case in point would be somebody who goes to take the services of the fitness center although they are on a journey. So, wellness tourism is far different than medical tourism from many aspects. Medical tourists travel to obtain treatment for a spotted disorder however Wellness tourists travel to recover or preserve their wellbeing as well as quality of life. The journeys of Wellness tourism consist of a diversity of activities such as exercise, thalassotherapy, thermal springs, day spa and hotel spa.

LITERATURE REVIEW

Sushilkumar M. Parmar (2016) In common parlance, the term 'Wellness' mentions to the condition of being well as well as fit not only physically but also mentally as well as emotionally. So, wellness is the combination of leisure, spiritual, mental peace, medical as well as relief. It is appropriately said that excellent healthiness is the gift from God as well as the genuine wealth. The bigger disquiet for the virtuous healthiness has caused toward the extraordinary request for wellness tourism and that has generated a thrill between wellness pursuers through the globe. So reality, wellness tourism is as very longstanding such as Greece and Rome as well as Asian ancient civilization. Wellness tourism can be described as totally the actions of travelers at journey's end place, looking for the wellbeing consequential into a strong steadiness of body and mind as well as soul. Wellness tourism incorporates numerous activities of meditation, yoga, ayurvedic, exercise, therapy treatment of beauty as well as health resort etc.

Providing the package of recompenses specifically growth in attentiveness strength, illumination of physical fitness, thoughts, stress buster, therapy for elongated illnesses etc. In reality, wellness tourism is connected not only with medical tourism but also spiritual tourism because of the uniqueness of the individualities as well as goals. Nevertheless, medical tourism is dissimilar from wellness tourism.

(Dunn, 1959) Dr. Halbert Dunn first recognized the thought of 'wellness' in 1959 while he bring together a rounded state of healthiness connecting body, mind plus spirit equally well as ones instantaneous surroundings or environments. Within the minor form of literature on wellness tourism, the majority of educations dedicated on stimuluses to travel for wellness though summarizing the individualities of wellness tourists as well as market demand exploration did not fall far afterwards.

Smith and Kelly (2006) orated that one of the ancient forms of tourism is wellness tourism as well as the propagation of spas, centres of wellness, spiritual pilgrimages, holistic retreats, complementary as well as unconventional therapies is very remarkable.

Mueller and Kaufmann (2001) determined that there are a requirements for vibrant differentiation of the wellness perception from the treatment. Thus, exceptional prominence on controlling of quality as well as professionals of wellness (sports instructors and wellness trainers, physiotherapists and doctor) was furthermore recommended.

Upadhyaya (2014) done the research to discover the procedures to improve the strategy of not only medical tourism but also wellness tourism. He too stressed on construction of brand image of the country, appropriate strategy frame work, worthy infrastructure as well as proficient marketing professionals for wellness tourism.

Koncul (2012) specified that it is significant to dedicate an extensive share of leisure-time in activities related to health, sport as well as additional wellness.

Shaik (2013) endeavored to discourse the problems and diagnoses of medical industry as well as Indian wellness industry and to framework policies for creation of India as an ideal center for not only medical tourism but also wellness tourism as well as similarly recommended to categorize the major and minor problems tackled by the industry of tourism.

OBJECTIVES

1. What actually is Wellness Tourism in India, to have serious in sides.
2. To discover the complications and challenges faced by wellness tourism of India.
3. Attentiveness of numerous government programs of advertising.

RESEARCH METHODOLOGY

Secondary data was gathered through several sources such as references materials, newspapers, magazines, internet, books etc.

Wellness Tourism – An Emergent Industry

An industry of wellness tourism has developed at a very fast speed since a thriving in worldwide awareness in fitness, health, wellbeing, besides buyer having supplementary disposable income. Prominent companies in the hospitality segment are taking an advantage of on these kinds of health-conscious buyers by integrating facilities of fitness in their hotels as well as contributing in-room yoga mats. On the other hand, it's not just hotels which are providing facilities of fitness to tourists seeking for wellness. So, airports everywhere in the globe are commenced to move in the market by proposing the tourists, indoor green spaces, organic restaurants, massage chairs, walking tracks as well as rooms for meditation. The report of Global Wellness Institute

described “Global Wellness Tourism Economy” predicts that the tourism of wellness will raise at an average annual rate of 7.5% in the year of 2022 associated to 6.4% annual progression prediction for overall worldwide tourism.

Why Wellness Tourism is Very Important?

Wellness Tourism is opted to Gain below Benefits.

- To eliminate of tension, stress and anxiety
- To grow association with soul
- To control intensively fatal and chronic diseases
- To obtain the sensation of happiness
- To realize great concentration capacity as well as restraint over the oneself
- To bring strong stability into mind, spirit as well as body

Major components of Wellness Tourism:

- **Wellness Tourism Association:** Association of wellness tourism not only encourages but also improves products or services of wellness tourism. It is the collection of service providers of wellness tourism which chooses outline of services of wellness tourism as well as additional connected problems.
- **Accreditation Authority or Board for Wellness Tourism:** Such board for wellness tourism or authority for accreditation identifies centres of wellness tourism and measures the facilities and amenities of such wellness centers. Such authority should furthermore deliver Licence. For example – AYUSH and NABH
- **Wellness Tourism Facilitators:** Facilitators of Wellness tourism are organizations who contribute in tourism of wellness such as Travel Agent or Tour Operators.
- **Wellness Tourism Service providers:** Retreat centers, Hospitals, Spas, or Ashram wellness center, Ayurvedic health center where facilities and amenities of wellness are accomplished.
- **Wellness Seeker:** Seeker of wellness is one whose resolve of appointment is wellbeing.
- **Government Agency:** The policy is framed by the Ministry of Tourism and State Tourism Department relating wellness tourism as well as improve required infrastructure by the means of assistance of finance.

Examples of Activities for Wellness Tourists by Category

❖ Health (Integrative Health Centers, CAM Centers and Wellness Centers)

- Healthy eating
- Integrative medicine
- Diagnostics
- Check-ups

❖ Nutrition (Organic Restaurants, Health Food Stores)

- Detox
- Culinary experiences
- Weight management

❖ Fitness (Gyms and Fitness Centers)

- Gym and Fitness center visits
- Stretching
- Fitness classes
- Pilates

❖ Eco and Adventure (Parks, Wildlife Sanctuaries and Nature Preserves)

- Biking
- Nature visits

- Hiking
- Taking walks
- ❖ **Personal Growth (Lifestyle Retreats and Wellness Retreats)**
- Retreats
- Stress reduction
- Life coaching
- Music and arts
- Reading
- ❖ **Spiritual and Connection (Yoga Retreats, Spiritual Retreats and Ashrams)**
- Volunteering
- Prayer
- Time alone
- Time with friends and family
- ❖ **Mind-Body (Yoga Studios and Martial Arts Studios)**
- Yoga
- Biofeedback
- Qigong
- Tai chi
- ❖ **Spa and Beauty (Healthy Hotels, Wellness Cruises, Health Resorts, Spas, Salons, Bath and Springs)**
- Massage
- Body treatments
- Bathing
- Hair and nails
- Facials

GROWTH AND PRESENT STATUS OF WELLNESS TOURISM

Current Scenario

In the year of 2017, our nation India categorized seventh in the top twenty markets of wellness tourism, as well as tenth amongst the top twenty markets of spa in the globe, though standing third in both the top ten markets of tourism of wellness as well as top tenth markets of spa in Asia Pacific region. As described by reports, citizens of Indians made fifty six million trips related to wellness, not only domestic but also international, in the year of 2017 (a progression of forty five percent over in the year 2015), which comprised US\$ Sixteen billion expenses value. Further, our nation India categorised second in positions of primary growing markets for wellness tourism, portraying an average annual growing rate of Twenty percent from the year 2015 to the year 2017, and addition to a small more than Seventeen million journeys of wellness in the similar time era. Previously, recognised to be a precise niche approach, nowadays because of an extreme alteration in lifestyle of individuals, wellness tourism is an activity to grow into the predominant. "Wellness industry sustained to occur from concept of niche lifestyle into a mainstream product and service with extraordinary growing precedence. Wellness industry projected to be value over US\$ Three trillion, signifying more than five per cent of all worldwide economic output. According to the contemporary approximations of Ernst and Young, wellness industry of India is predicted to produce at a CAGR of approximately Twelve per cent for the next five years as well as is predicted to reach Rs. One and half trillion by 2020, increasing disposable incomes, modification of lifestyle etc. or some significant actualities motivating the development of services of wellness," The wellness tourism industry of India flourishes largely on the major components like yoga, ayurveda, meditation as well as rejuvenation between others. According assumptions of industry, wellness tourism of India has almost to reach US\$ Nine billion by the year of 2020. According to the reports, it is considered that India will trace excessive statures in the industry of wellness tourism in the upcoming years, "Year of 2017 can be considered as a year of benchmark for the Industry where wellness tourism of India set remarkable criterions for itself with largely

volume of the Industry of wellness tourism developed at a CAGR of Twenty percent index. Thus, it is obvious from the preceding years outcome that the previous made forecast will verify to be right as well as medical tourism plus wellness tourism is likely going to touch US\$ Nine billion mark by 2022. The year brought foremost rise in revenue observing major progress in the revenue centres of the industry. Currently, India is tremendously compelled by the native tourists for the segment of wellness. Enlargement in disposable earnings as well as customers craving to improve their not only mental wellbeing but also physical wellbeing, has preferred the request for these wellness services. Moreover, rising hectic lifestyles categorised by job related stress as well as anxiety has been enhancing the market development through the world. The industry of wellness is speedily developing in India as well as has an incredible scope for enlargement. Thus, in this new period of health consciousness, people want to identify more as well as eager to expend on living a complete life, health as a service will appear as a foremost industry. So, people are observing for destinations wherever additional reliable experiences of wellness can be found.

Source Markets

Because of the absence of engaged as well as focussed advertising of wellness tourism, the core centre market for India quiet leftovers the national market. Thus, in the last five years, the Indian government has taken intense attention in endorsing this segment of wellness tourism. The Ministry of Tourism has provided 50:50 assistance of finance to companies to up to Rs. 10 lakh for contributing in events and fairs and sanctioned by the Ministry of tourism in markets of overseas underneath the scheme of Marketing Development Assistance (MDA). The ministry of tourism has also provided assistance of finance of up to Rs. 25 lakh for investors contributing in shows of tourism promotion. It additionally, also deals of support of finance for training programs on skill offering. Discussing about the foremost source market for wellness tourism, the national market is our major customer base. It has always been reflected that the travellers from western countries travel for health and well beings but currently things have transformed. Indians are so attentive about where they expend their day off and look at day off as good opportunities to revitalize, heal as well as come back resilient to their day to day lives. In our country, we have many foreign travellers who visit to us more than two times in a year besides this includes domestic travellers from cities of Tier II and III. The concept of Health Holidays are flattering mainstreams for citizens of India. Nearly, some of the other markets which have very well matured wellness travellers consist of United Kingdom, America, Germany as well as now the Commonwealth of Independent States plus China is included to this listing. At a level of property, our countries stake of overseas business is becoming more profitable as well as in three years from present will be 40 per cent of the topmost line. The investors of Indian wellness tourism are now considering to cultivate unique source markets. Comparable to the outbound progression story of India, nowadays many countries of Asia are perceiving parallel trends. So, this can generate more source of wellness markets from inside region of Asia-Pacific. The markets with traditional source are still constant as well as increasing which are mostly German, Russia alongside with The Commonwealth of Independent States as well as North America. Currently, what we are longsighted modifying is the progression from South East Asia as well as China and predict them to exceed approximately traditional markets by the year of 2025. In relations of the profile of the traveller, so the millennial travellers are the one who have continuously shattered the standards as well as discovered innovative actions and practices. The Millennials establish the major population of travellers in the globe. Millennials have influence of implausible expenditure, as well as they seek for traditional vitality besides authentic experiences. They like to satisfy themselves in various holistic programs such as detoxing cleansing with food, spa gateway as well as stability of emotion, life-changing journey of wellness. These travellers of wellness to loves to share their experiences of wellness activities on social media.

Popular Experiences

India is known for the origin of Ayurveda, so our country has to be the foremost centre for wellness tourism. Nevertheless, fascinating to be noted, currently travellers are electing wellness tourism for numerous serious complications of health. Discussing about the prevalent therapies, treatments of Ayurveda like pizhichil, shirodhara as well as navarakizhi have been very attractive amongst the travellers who travels on weekend though the therapies of naturopathy like hydrotherapy, deep tissue massage as well as acupressure have been very fulfilling. Nevertheless, we are observing an increasing tendency of patients looking for medical treatments for parkinson's disease, obesity, spondylitis, diabetes as well as ulcers. Nowadays, one of the foremost challenges universally has been the speedy escalation in lifestyle diseases such as infertility, obesity, diabetes etc. Wellness investors of India are providing to these problems effectively as well as are curating custom made treatments. The wellness travellers visits the wellness centres for numerous motives such as detox, ayurvedic panchakarma, illness-management, rehabilitation, emotional healing, medicinal reversal (diabetes, hypertension), weight management as well as fitness. The proficiency of the wellness centre depends on

approach of multi-dimensional where integration of different sciences as well as modalities to offer the finest wellness services to the traveller. Therefore, more than treatments, the aspects of mental health, nutrition, improve sleep quality as well as an optimistic environment is a must for an efficacious destination of wellness. Chi Nei Tsang which is Tao School of healing, Pranic healing which is energy healing as well as among ayurvedic treatments such as udwartanam utilizing medicated powder, improves circulation of blood as well as deployment of fat as well as navrakizhi which is with medicated rice from Kerala, excellent for rejuvenation) are some of the prevalent therapies. Ayurveda has always been dedicated not only on anticipatory care but also treatments, as well as with the data of last five years the most sought or recommended programme was the panchakarma offered by specialized doctors. It is agreed that the customised treatments as each and every person is an individual as well as all the plans of treatment are centred on the body type of patient. The ultimate ailments we treatment were for psoriasis, obesity, infertility plus eczema also disorders of bone such as arthritis etc. and in the precautionary characteristic is has been rejuvenation as well as programme of destress.

Role of Ministry of 'AYUSH'

The year of 2014 is considered as revolutionary year for the industry of wellness because the Indian government established the (AYUSH) which is Ministry of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy. This was a significant step in not only growing the consciousness about the several wellness practices, but also to bring regulations in the sector of wellness. Glorifying the efforts are taken by the Ministry of AYUSH for the growth and development of wellness sector. The Ministry of Ayush has absolutely remained a huge backing for the wellness industry also will remain to organise so, with a further rational as well as directed methodology towards advertising as well as endorsing AYUSH industry, absolutely there will be the progress as well as estimate a rise of not less than 15 percent to 25 percent. Instantaneously afterwards the inauguration of the Ministry, the subsequent foremost step was the initiation of 'World Yoga Day', which has yet again facilitated in encouraging the ancient practise of health and wellbeing. Indian government is endorsing AYUSH as well as by the inventiveness taken on International Yoga Day which revolved into international event acknowledged by United Nations, which assisted in generating consciousness at the worldwide platform about Indian yoga and wellness industry. Yoga has always been endorsed as a therapy for mental and physical ailments, as well as this is what the clientele need for the period of their holidays. Because of such praiseworthy efforts taken by the Ministry, the industry today believes additional initiation of not only incentives but also relaxations. The ministry of AYUSH can announce in future numerous incentives as well as schemes that can create it for achievable as well as prosperous for entrepreneurs who wants to cultivate centres of wellness in India. Nevertheless, in the concurrently, AYUSH has been constructing a lot of consciousness about remunerations of a good standard of living as well as has been endorsing Indian sciences such as Ayurveda, Yoga etc. Additional foremost challenge is there is no appropriate concentrated campaign for the wellness tourism in the global wellness markets. So, this section has been regularly encouraged as a surplus to the ordinary holidays. As a people of this nation have failed to influence on our benefit of being the origin of Ayurveda as well as Yoga. In India, there are very less destinations which has been vended decently as a destination of wellness as well as furthest remaining have been advertised as wellness tourist destinations. The necessity of the hour is to advertise various destinations as full-fledged centres of wellness which could satisfy to tourists who look for rejuvenation.

Challenges

To begin with, one of the foremost challenges in this segment was to sustain the eminence as well as genuineness of providers of wellness services. The Indian government has taken an appropriate critical leap of familiarizing excellence management with the assistance of Quality Council of India to encompass the National Accreditation Board for Hospitals and Wellness Centres (NABH) certification for centres of spa and wellness. Although this initiative of the Indian government desires to stare at several additional challenges to further enhancement this segment of wellness. Security as well as safety which is a challenge because tourism is a insubstantial committed industry as well as wellness tourist will merely come to visit the destination of wellness tourism for calm, peace, meditation, health, yoga, fitness, wellbeing hence the first primary concern will be safety as well as security of the tourist. Nonexistence of infrastructure remains additional threat which distresses this segment of wellness. Enlightening the Indian brand image of will assistance the tourists encourage the segment of wellness exceptionally. Additional astonishing challenge which the segment of wellness is fronting is the deficiency of capability. Currently, the supply of competent workforces is depleting day by day. The supply of well-educated doctors as well as experienced workforces in the segment of ayurveda as well as naturopathy has been sinking from some of the previous years. Furthermore, there are segment of medical specialists which are presently stubborn to only converse in the local language. Currently there is a lot of wakefulness to construct up the base of language to comprise international languages as well.

Opportunities

As per a report released at the opening Global Wellness Tourism Congress (GWTC), the wellness tourism industry with annual revenue of \$1.3 trillion accounts for 14 percent of total global tourism earnings, which is expected to reach 16 per cent in next five years. Contribution for the direct employment to more than 12 million worldwide individuals, so wellness tourism is on its way to grow into a ubiquitous business. Wellness travelers commonly expend 130 percent extra than regular travelers, so it is one of the foremost causes for the speedy progression of wellness tourism in the world. The rapid enlargement of tourism of wellness is not only attracting the private companies but also fascinating the consideration of government undertaking worldwide public companies. The foremost influence of wellness tourism is that it carries earnings of direct foreign exchange, as well as contributes revenues profoundly to government plus provide huge employment also opportunities of business to the native citizens. An enormous medium of foreign exchange offered by the Wellness tourism to the host economies, because foreign wellness tourists carry in foreign currency to recompense for wellness products as well as services they obtain throughout their vacation at a specific destination. The fast progress of wellness tourism globally, other than aggregating earnings of foreign exchange as well benefits in engendering direct or indirect employment opportunities to the native residents. While, the jobs offered by hotels, restaurants, taxi services and sale of souvenirs are considered as direct employment, the delivery of goods and different other services required by the wellness tourism industry are considered as indirect employment. Observing the financial remunerations offered by wellness tourism, majority of the governments throughout the globe are eager to capitalize in the expansion of native infrastructure to fascinate new foreign wellness travelers from developed countries. They must to develop good quality roads, system of public transport, systems of water and sewage etc., for accommodating wellness travelers who requires high-end services. Upgraded infrastructure not only boosts tourism, but also rises the quality of life of the native residents. Furthermore, some wellness tourism destinations make an impact on foreign travelers as well as influence them to visit the destination regularly or even inspire them to turn into permanent residents of that specific destination, which ultimately surges the requirement of the housing as well as other necessary commodities as well as complete development. Wellness tourism generates opportunities of employment in smaller towns as well as villages or else far off areas, besides verifies the migration of nation population to greater cities or else urban areas. Thus, it creates small towns more eye-catching for young individuals who are scheduling to shift to industrial regions in exploration of a career as well as changes their attitude concerning their not only customs but also society.

Importance and Advantages of Wellness Tourism and Its Effect on Modern-Age Travel

- Improvement of personal health
- Benefits for Environment
- Benefits for Economy
- Constructing superior facilities
- Assists in preserving tradition and culture
- Creates employment
- Wellness travel can do miracles for baby boomers
- A great relieve from stress and recharge
- A purposeful trip
- A medium to achieve fitness goals
- An opportunity to travel around the globe
- Pointers to acknowledge when preferring for wellness travel
- Wellness-centric travel, the precedent of modern age travel
- Regions displaying appreciable progress in wellness-centric travel
- Short level of relaxation inspires travelers to wellness travel
- Greater expending power a crucial provider to wellness travel
- Changing aspirations motivating wellness-centric travel
- Destinations with wellness resources are establishing themselves in wellness-centric travel
- Meeting medical necessities – additional feature of wellness travel

CONCLUSION AND RECOMMENDATIONS

In brief, tourism of Indian has massive capacity, not to reference the change in inclusive financial as well as community development to generate occupations as well as gain large collection of foreign exchange. Plentiful has been done to escalation of capabilities of air seating, growth of the trains as well as rail links to important wellness tourist destinations, to supply four-lane routes connecting foremost tourist centers as well as expansion lodging entry over the introduction of new hotels interested in the hospitality market as well as to strengthen the improvement of compensated accommodation to travelers. Nevertheless there is quiet much more to be accomplished. As tourism is known as a multidimensional process as well as essentially a service industry, it is very significant that all sections of central as well as state governments, the private sector as well as voluntary organizations, turn into dynamic collaborators in exertions to accomplish sustainable growth of tourism if tourism in India is to turn into an international player. Predominantly, although wellness tourism is an immense division of tourism, comparatively novel as well as more research is needed in order to recognize the systematic contextual of the tourism.

Scope for Future Research: There is huge need of developing new wellness tourism destinations in India at various places. The training and development of the skilled manpower is needed. The development of world class infrastructure is need to build up for the domestic as well as international tourist.

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The Investigation of Various Lanthanide (III) Nitrate Complexes of Benzilmonoximehydrazide-O-Bromobenzaldehyde

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ABSTRACT

The investigation of five new Lanthanide (III) nitrate complexes of benzilmonoximehydrazide-o-bromobenzaldehyde (HBMHoBB) ligand was obtained by condensation of benzilmonoximehydrazide and o-bromobenzaldehyde with ethanol and concentrated hydrochloric acid. Ln(III)NO₃ viz Tm(III)NO₃, La(III)NO₃, Ho(III)NO₃, Er(III)NO₃, and Nd(III)NO₃ were chosen to construct additional complexes. Some physicochemical experiments, including micro-elemental analysis, magnetic studies, electronic and ft-ir spectrum analyses, were used to characterize the produced Lanthanide (III) nitrate complexes. All prepared Lanthanide (III) nitrate complexes were also tested for antibacterial activity.

Keywords: Ln (III) NO₃ complexes, elements and analysis and electronic spectra.

INTRODUCTION

In the periodic table the largest series of lanthanides or lanthanum¹⁻². The three ions of Lanthanides (III) because of their charge and size are from stable complexes for the best ions with higher coordination number³. Lanthanide (III) coordination compounds are exhibit 6-10 coordination numbers are reported⁴.

In the early stages of coordination chemistry's development played a major role in Schiff base metal complexes⁵⁻⁹. We would want to discuss Lanthanide (III) nitrate compounds with HBMHoBB in our study work shown in the **Figure-1**.

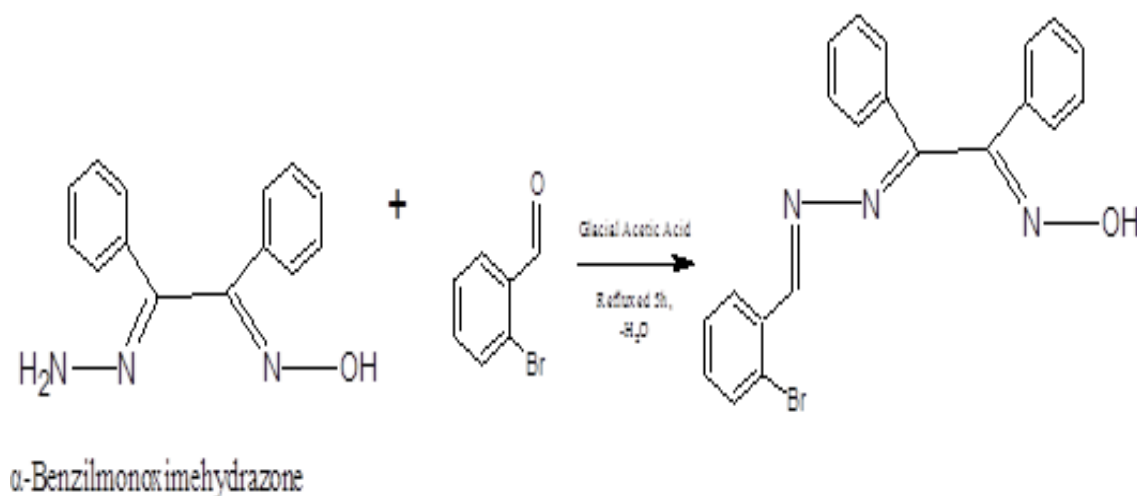


Figure-1: Preparation of α -benzilmonoximethiocarbohydrazide-*o*-bromobenzaldehyde

Experimental

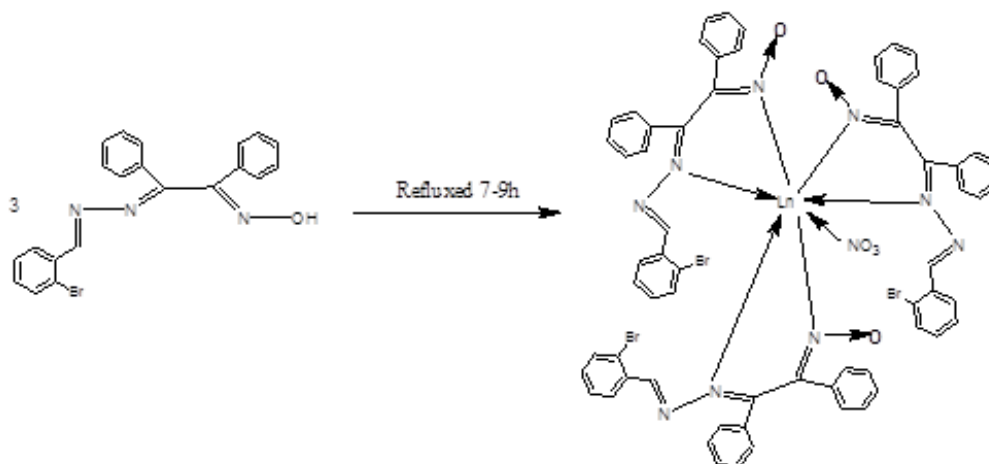
Ln(III)NO₃ viz Tm(III)NO₃, La(III)NO₃, Ho(III)NO₃, Er(III)NO₃, and Nd(III)NO₃ were obtained from S.D. fine chem and used as such. In addition to a variety of other sources, solvents were sourced as; loba chemie, S.D. fine chem and Merck.

Preparations HBMHoBB ligand

The HBMHoBB ligand was prepared by a reported method¹⁰.

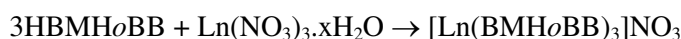
Lanthanide (III) Nitrate Complex Formation

The Lanthanide (III) complexes were made by combining and reacting the appropriate Ln(III)NO₃ ions (1mmol) in methanol with HBMHoBB ligand (1:3) in the methanol solvent. For 7-9 hours, in a water bath, the reaction mixture was refluxed. Allow the mixture to cool, filtration was used to collect the final colored complexes, which were then washed with hot distilled water and dried under vacuum.



RESULTS AND DISCUSSION

Interaction of Ln(III)NO₃ viz Tm(III)NO₃, La(III)NO₃, Ho(III)NO₃, Er(III)NO₃, and Nd(III)NO₃ with HBMHoBB ligand results in the complex overall composition of a formation [Ln(BMHoBB)₃]NO₃. The preparation complicated shown by the general equation below;



The prepared Ln (III) complexes, **Table-1** contains physical and elemental analysis results. The prepared novel Lanthanide (III) complexes were stable and stored for an extended period of time. Their hygroscopicity is unaffected and soluble in common organic solvents. Lanthanide (III) nitrate complexes show 1:1 electrolyte in nitrobenzene medium¹¹. The prepared Ln(III) nitrate complexes molecular weight data also support this fact. Magnetic susceptibility data show the diamagnetic behavior of the Ln(III)NO₃ complexes, while paramagnetic behavior of other complexes due to the existence of 4f-electrons that are effectively insulated 5s²p² electrons¹². This demonstrates that 4f-electrons are not involved in the bond forming process. The synthesized Lanthanide (III) complexes magnetic susceptibility data are assembled in **Table-1**.

Table 1: The ligand and its lanthanide (III) metal complexes analytical and physical properties

Compound	Color	Yield %	M.P. / Dec. point° C	Elemental Analysis					Magnetic Moments (B.M.)	Electrical Conductance 10 ⁻³ M(in DMF) mhos
				% M Found (Calcd)	% C Found (Calcd)	% H Found (Calcd)	% N Found (Calcd)	% O Found (Calcd)		
HBMHoBB	Yellow	76.98	205	-	62.08 (61.92)	3.97 (3.88)	10.34 (10.02)	3.94 (3.85)	-	-
[Tm(BMHoBB) ₃]NO ₃	Brown	79.33	245	12.21 (12.29)	55.63 (55.00)	3.25 (3.21)	10.12 (9.50)	6.94 (6.60)	5.39	21.28
[La(BMHoBB) ₃]NO ₃	Green	81.26	244	10.70 (10.21)	55.84 (55.80)	3.32 (3.21)	10.34 (10.07)	7.09 (7.03)	-	22.33
[Ho(BMHoBB) ₃]NO ₃	Orange	71.69	249	11.95 (11.33)	54.79 (54.33)	3.26 (3.20)	10.15 (9.50)	6.96 (6.58)	10.41	23.21
[Er(BMHoBB) ₃]NO ₃	Brown	74.00	253	12.10 (12.05)	54.68 (54.52)	3.25 (3.21)	10.13 (10.02)	6.94 (6.66)	9.51	22.46
[Nd(BMHoBB) ₃]NO ₃	Green	71.56	251	10.61 (10.58)	55.63 (55.29)	3.31 (3.30)	10.30 (10.18)	7.06 (7.03)	3.61	21.89

FT (IR) SPECTRA STUDY

The FT(IR) spectra were acquired at wavelengths ranging from 400 to 4000cm⁻¹ using KBr pellets. The HBMHoBB ligand FT(IR) spectrum analyzed by comparison of the FT(IR) spectra of prepared Ln(III) nitrate complexes and observed on their assignments were listed in **Table-2**.

In the spectrum of HBMHoBB ligand of observed broadband at 3209cm⁻¹ due to oximino -OH group, this band disappeared in Lanthanide (III) complexes, suggested that the HBMHoBB ligand the coordinated to Ln(III) metal ions through oximino group *via* deprotonation¹³⁻¹⁴. In case of Lanthanide (III) complexes, notable peaks at

1569 and 1625cm⁻¹ HBMHoBB ligand show negative shifts and appear in the ranges 1530-1532 and 1605-1610cm⁻¹. These notable peaks in attributed to the azomethine and oximino of groups respectively, these stretching and it shipped suggested that a Lanthanide (III) complexes coordinated to HBMHoBB ligand through azomethine and oximino nitrogen atoms¹⁵⁻¹⁶. In the Ln(III) nitrate complexes some In the region 472- 495cm⁻¹, medium to weak bands were found. For various Lanthanide (III) complexes, these new bands are designated as (Ln-N) modes¹⁷⁻¹⁸.

Table 2: Data from the FT(IR) spectroscopy of the ligand and its metal complexes

Compound	$\nu(\text{O-H})$	Ar(C=C)	Ar. C-H	C=NN	C=NO	N - O	N-N	M-N
HBMHoBB	3209	3107	3082	1625	1569	1018	1095	-
[Tm(BMHoBB) ₃]NO ₃	-	3106	3073	1605	1531	1010	1093	472, 494
[La(BMHoBB) ₃]NO ₃	-	3104	3069	1610	1530	1007	1109	473, 495
[Ho(BMHoBB) ₃]NO ₃	-	3216	3082	1608	1532	1008	1099	480, 493
[Er(BMHoBB) ₃]NO ₃	-	3212	3070	1609	1530	1006	1098	474, 491
[Nd(BMHoBB) ₃]NO ₃	-	3208	3068	1606	1531	1009	1100	473, 495

Electronic Absorption Spectra

The Ln(III) nitrate complexes electronic spectral studies are assigned and important covalency tools measurements are listed in **Table-3**. The Ln(III)NO₃ complexes line like The UV visible and near-IR spectra are produced by electronic transitions inside the 4f levels that are either normal or prohibited, but become allowed after the degeneracy of the 4f orbital is removed by an external crystal field.

[La(BMHoBB)₃]NO₃ complex have in the visible region no significant absorption. The absorption bands of [Tm(BMHoBB)₃]NO₃, [Ho(BMHoBB)₃]NO₃, [Er(BMHoBB)₃]NO₃ and [Nd(BMHoBB)₃]NO₃ complexes in the near-infrared and visible regions may be observed as a result of transitions from ground level to ³H₆, ⁵I₈, ⁴T_{15/2} and ⁴I_{9/2} respectively to the excited J level¹⁹⁻²².

The shift in the hypersensitive bands has been used to estimate the sensitivity covalency factor ($b^{1/2}$), nephelauxetic effects, covalency angular parameter along with Sinha covalency parameter²³.

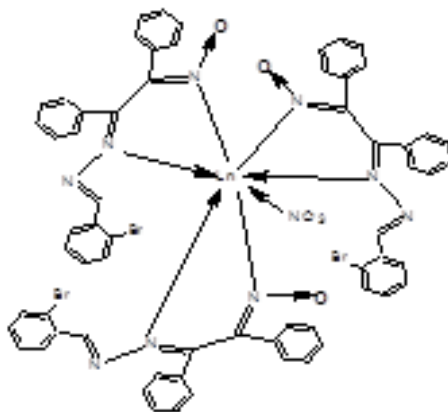
In the prepared Lanthanide (III) metal complexes electronic spectral studies yield and (1- β) positive values implying that the ligand-metal bonding in the compounds is covalent The angular overlap parameter and bonding parameter values were also discovered to be positive, indicating the presence of covalent bonding complexes. **Table-3** displays the electronic spectral data.

Table-3: HBMHoBB ligand UV-Visible spectral data and its Ln (III) metal complexes

Compound	λ_{nm}	ϵ (dm ³ /mol/cm)	Transition	
HBMHoBB	339	12723	$\pi \rightarrow \pi^*$	
	249	20905	$\pi \rightarrow \pi^*$	
[Nd(DMHSa) ₃]	816	118	⁴ F _{9/2} ← ⁴ H _{5/2}	$\beta_{\text{ave}} = 0.9867$
	754	259	⁴ P _{13/2} ← ⁴ H _{5/2}	$b^{1/2} = 0.0665$
	587	956	⁴ P _{9/2} ← ⁴ H _{5/2}	$\delta\% = 1.348$
	520	5659	⁴ P _{7/2} ← ⁴ H _{5/2}	$\eta = 0.0066$
[Tm(DMHSa) ₃]	690	1077	³ F ₃ ← ³ H ₆	
	790	2948	³ H ₄ ← ³ H ₆	
	976	7650	³ H _{5/2} ← ³ H ₆	
[La(DMHSa) ₃]	392	110	MLCT	
	243	13541	MLCT	
[Ho(DMHSa) ₃]	740	89	⁷ F ₂ ← ⁵ D ₀	$\beta_{\text{ave}} = 0.9553$
	466	4952	⁷ F ₁ ← ⁵ D ₀	$b^{1/2} = 0.0024$
	437	5368	⁷ F ₀ ← ⁵ D ₀	$\delta\% = 0.9553$
	405	6671	⁵ L ₆ ← ⁷ F ₀	$\eta = 0.0029$

CONCLUSION

The prepared Lanthanide (III) nitrate complexes preferred corresponding number is 7. This coordination number depends upon the presence of the anions' composition. The molecular weight and the conductance results suggest that complexes contain the nitrate ion outside of the coordination sphere. In all complex experiments, the FT(IR) spectrum data demonstrated that the nitrate ions were monodentally covalently linked to Ln(III) metal ions.



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Covid-19, E-Learning and Digital Divides in Education: A Descriptive Analysis

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ABSTRACT

This paper highlights the impacts of the covid-19 pandemic on the education, for teachers, student, and institutions. No one predicted that the Covid-19 would come and it will alter the life of people. Because of Covid-19, lot of changes came to our life and world and it will take some time for everyone to adopt the 'new normal'. Impact of Covid-19 was everywhere, which resulted in the closure of all the educational institutions. Apart from immediate visible impacts, there were medium and long term impacts which are very significant but invisible. This chapter also tried to review the actions taken by the governments and educational institutions to continue the teaching-learning process during the covid-19-pandemic. This chapter discusses some observations and policy recommendations before the restarting normal education mode. The short-term impacts of the crisis on education are easily recognized, but its long lasting impact is hard to predict as we did not have past experiences of this kind of crises. The immediate impact on the students was the temporary pause of face to face teaching, (and we didn't know, how long it will last), on normal daily life, costs and financial burdens, learning continuity and mobility. Teachers were also affected significantly professionally. Temporary Non-teaching staff had to face the possible financial curtailment due to the cancellation of fees or reduction in student enrollment. The impact of disruption of face-to-face activities was highly erratic and depends, on the ability to remain active in their academic activities and, on their financial sustainability. However, public educational institutions have reopened in full blown economic recession and major cuts in public budget in education are also expected, like 2008 financial crisis. It is very possible to anticipate that the crises will lead to definitive closures of some private institutions.

Keywords: covid-19, digital divide, inclusion and equity, Industry 4.0, virtual education

INTRODUCTION

The COVID-19 induced pandemic led to the **closure of universities, colleges and schools** round the world, expecting that **public health officials'** advice of social distancing could help to flatten the infection rate and shrink total sufferers from the disease. Across the world, the spread of corona-virus had led to profound changes in social interaction and organization, and therefore the education institutions (sector) hadn't been immune. Pandemic precautions called "**social distancing**" or "**physical distancing**" has attempted to decrease interpersonal contact and thus tried to minimize the type of community transmission that might develop quickly in crowded social networks just like the school, college and university campus.

At the outset, most governments decided to close the schools temporarily to reduce the impact of Covid-19. After reopening for a few grades, the number of infection rates increased and then closed again. Education, as a result, had mostly relocated online. The **World Economic Forum** reports a rush in the use of language apps, virtual tutoring, video conferencing tools, and online learning software in the last couple of years. India was also witnessing an e-learning flourishing. Using Zoom, WhatsApp and Skype has become the norm for students, parents and teachers. Yet, this unexpected conversion to online hardly compensates for the absence of the classroom involvement. Though schools were closed, students were attending their classes through online classrooms. Though it was a good thing happening, on the other side, there were lots of students who didn't own the resources to attend the online classes suffered a lot. Many students were struggling to get the gadgets prerequisite to attend online classes.

As the educational institutes were closed, students were missing out on social contact, which is necessary for learning and all round development. Therefore, they were deprived of opportunities for multidimensional growth. Because of **rapid and unplanned transition** to online learning particularly in LDCs like India, the challenges, ahead of us, were very critical. New ways of delivery and assessments of learning outcomes was to be developed which opens immense opportunities for this unexpected, sudden and rapid transformation in the field of curriculum development, evaluation and pedagogy. One common trend in education round the world was that the '**emergency e-Learning**' protocols, making the rapid transition from face-to-face classes to on-line learning systems. More than ever we saw the significance of supporting robust research and development systems, in education and in public health as well.

IMPACT ON EDUCATION

The frightening and severe impact of Covid -19 pandemic had shaken the whole world to its core. Further, most of the Governments including India had **temporarily closed educational institutions** to contain the spread of pandemic. These world-wide closures were affecting over 91% of the worlds' student population. Apart from students, teachers, and families, school closure have far-reaching economic and societal consequences. The impact was more acute for **disadvantaged children** and their families, due to halted learning, compromised nutrition, childcare problems, and the economic cost to families who **lost their work** due to nationwide lockdown. (Verma and Prakash, 2020).

Educational Institutions: Steps Taken

Because of the COVID-19 outbreak educational institutions had to take and adopt several digital technologies. **Record video lectures** uploaded on YouTube or similar platforms for students to watch and listen at their own time and pace. Teachers were providing notes and content related to the courses through email, WhatsApp, etc. Lectures can be delivered on **digital platforms** at scheduled slots when students join to attend the "classes". There were many platforms available including MS-TEAM, Google meet, CISCO Webex, Team link, ZOOM etc. and it was possible to see and interact with each other.

Ideally, the platform must have the following facilities to have a face-to-face classroom environment.

- Provision to see each other.
- Presentation of slides, document or content.
- Use of white/black/green board.
- Discussion opportunity.
- Marking attendance.
- Conduct of examination, assignment, evaluation and assessment.

Limitation of E-Learning

Online teaching **increased screen time** for children, few **parents who aren't comfortable** with technology themselves; **classes get disturbed due to Internet issues**. In nuclear families, mainly, parents might have to miss work to take care of their children. Some of them could be medical professionals, who are urgently needed to alleviate the pandemic.

Teachers are under pressure, too. Everyone has an exclusive style of teaching. Over a period of time, they would have built an empathy with the students through observing their body language in class, their communication with classmates. Now, they will see them on computer monitor and there might be a lot of **disturbances, chaos, and noise** in the background. Teachers who are all experts in Blackboard, Chalk, books, and classroom teaching are really **new to this digital teaching** arena, but they are adopting the new online mode and handling it to help the students in the current crisis situation. But on the negative side, many teachers are in search for an **alternative job** to support their families.

Many unsettled teachers who are expert in the traditional classroom teaching **require training** and re-learning in this changed situation. **First step was to find right platform** for online teaching and **second step was how to use that platform correctly**. But using a platform and its features to teach effectively and ensure that all students were actually learning is very important. Classroom management, maintain discipline, disruption by student, keep the student attentive, appropriate length of class, ensuring effectiveness of teaching were some issues of online teaching or remote classrooms which were dealt with by the teachers.

There were other very **important issues** of online classes like the right online teaching techniques and strategies to **keep the students engaged** how to keep uninvited students, and trouble, out of the online classrooms. This was just a beginning and schools had also to give serious thought to planning and conducting **online assessments and evaluating** students online. Readiness for online teaching was critical and schools were at various stages in this journey. So, while oldsters were worrying about having the right hardware and set-up at home, school management and teachers were sorting out larger, critical and important issues.

Challenges and Concerns

Apart from already existing opportunity gaps there were differences among students in support from oldsters, differences within the capacity of colleges/schools to support students for remote learning and differences in **students' resilience, motivation, spirit and skill** of learning online and independently. There's a possible

tradeoff between well-being and **increased screen time** of online learning. We had to work out the right balance between these two. Many **oldsters weren't comfortable** with technology themselves. Classes frequently get disturbed due to **Internet issues**. In small nuclear families, oldsters might have to **miss work** to pay concentration of their children. Many of them could also be healthcare professionals, who are urgently needed to tone down the pandemic. It'll also necessary to provide professional and expert guidance to oldsters and students about the **safe use of online** tools, social networking, television etc. These were not only the concerns to be addressed. The primary and foremost is that the **non-availability of desktop/laptop** to participate into the online classes. The second concern is that the transparency in conducting **examination/assessment** online.

Educated parents are supporting their children throughout the pandemic, but we must understand that there are lots of **illiterate parents** and they are feeling helplessness to help their children in their education at home. In India lot of students who came to school just because they can get food. The great **mid-day meal scheme** helped many children from under privileged family. Because of the shutting of the schools, lots of students were suffering from not having enough nutritional food for their survival. Most of the school-going children are involved in **child labour to support their families** as a result of **drop-out**. There is a possibility that the education of female children and transgender children has affected, as their parents may see, the financial and opportunity costs of doing so.

There were difficulties as **exams** have to be postponed. There was always a **delay or cancellation of examinations**, which leads to confusion for many students. Examinations could not be conducted in time online. Developing a useful and well-defined online course, supports the instructor and learner means, devoting the appropriate time and forming the applicable course elements into the e-learning environment. Technology can offer a good substitute to the conventional education system, mitigate and compensate for the obstacles and inconvenience caused due to pandemic to the teachers, students and the education system as a whole. The educational institutions in India, from schools to universities, can **capitalize this adversity as an opportunity** in disguise and plan digital education a key component of the learning process for all learners in the future. This pandemic had not only affected the students but also the **financially weak institutions and schools**, resulting in close-down the same.

Everything was happened so swiftly that it was not possible to plan, calculate the potential risks and opportunities which brought about by the sudden unprecedented spread of this Covid-19 pandemic. Therefore under these circumstances it was imperative to study or measure the impact and what has come to light and what is likely to happen in near future in the field of education. The sudden unplanned shift to online learning without any ready-made infrastructure and proper curriculum had created the risk of becoming **passive learners** who may lose interest due to lack of visible attention. But, only few urban educational institutions can provide those facilities. Thus what about the learners in rural areas? So the main questions remains, what will be the future of the disadvantaged deprived underprivileged section of the society?

Opportunities: Silver Lining to This Crisis?

This sudden change also brought new opportunities that will convert the education system worldwide and lead to a **planned reform in education**. Teachers are becoming more technology savvy through practice/training. Educational institutions will be using blended learning where both **offline and online model** will become a model. It is a great opportunity for **companies that are developing learning management systems** to be used by school, colleges and universities. The learning management systems will create more openness and transparency in academics. There is a new opportunity of **collaborative teaching and learning of faculty members** from different organizations. Collaborations can benefit each other.

Non-face-to-face governance mechanisms might be the permanent governance formulas which might be swift and efficient, due to technology. Also, it is clear that the **circulation of documents can be limited to digital circuits**, also **reducing the need for printing**. In both cases, the direct economic savings, including the reduction of trips and the environmental impact, are undoubtedly not insignificant.

It is not possible to predict what the educational landscape will look like after the COVID-19, in part because of the magnitude of the community transmission threat posed by campus interactions (e.g., Weeden & Cornwell, 2020). Separating the digital divide, the portability of e-Learning may increase access to education in rural communities. Those who are unable to avail a traditional full-time face-to-face school due to personal or financial problems, the flexibility of asynchronous digital e-Learning may provide wider access. And even within traditional education institutions, hybrid or blended forms may help improve the quality of face-to-face teaching by moving content delivery online and focusing in-person sessions on active learning (e.g., Bowen, 2012).

Especially in developing countries like India, optional e-Learning might curb the burden of exorbitant tuition fees that makes higher education inaccessible for many individuals. Technology makes education easier, thus helps the students and teachers connect virtually in online classrooms, webinars, and so on. We were acquainted with and habituated to use of technology if teaching- learning. But the fact is that it is not available to all the students all over the country.

CONCLUSION AND RECOMMENDATIONS FOR FUTURE

As the impact of the pandemic on education was sudden, rapid and unexpected there was no emergency plan other than to suspension of face-to-face classes to maintain physical distance. It was important to think a way out of this crisis at the same time to ensure the highest degree of **inclusion and equity**. Specially, in the region with already unresolved challenges like growth without equality, inequities in access and achievement, it faced and the progressive loss of public financing. Yet, this sudden switch to online **barely compensates** for the absence of the classroom experience. Students, teachers and oldsters even had to adjust quickly to new routines. We had to modify and reinvent our model very quickly in support and combined effort of the students, oldsters and educational institutions.

It may be proposed to rent and provide computing devices within the cloud so the learning may be hassle free. It's also appropriate for AICTE to alter within the policy of insisting on a minimum number of computers in the institution. Several innovative techniques can be used to assess learning outcome levels. The open book examination system (of short duration) and reports/projects and/or assignment (requiring longer duration) could make the evaluation transparent and develop the comprehension and skills of the students required by **Industry 4.0**.

We needed to make sure the **access to device and internet connectivity** for the students who didn't have them. If it's unattainable, the **supplementary modalities** like television, radio, podcasts, DVDs etc. should be provided to students. So, we needed two strategies, short-term and medium-term. In the short-term it was not be possible to ascertain or create infrastructure and provide device to everyone. So it's better to rely on low cost technologies like radio and/or educational television. But it's necessary to invest to develop these infrastructures and to do that educational budget needed to be enhanced considering an essential investment under this pandemic situation. The Government should have subsidized phone data and phones for the deprived people in rural areas. There we needed an aggressive drive to do this as quickly as possible.

On the Part of the Governments

- Include higher education in stimulus packages/plans for both economic and social recovery
- Build a national consensus for a strategy for fostering recovery and innovation in education.
- Provide an unambiguous regulatory atmosphere for the reopening of classrooms that ensure a sense of security
- Commit to international cooperation

However, Covid-19 pandemic and nationwide lockdown **provides a chance to rethink to alter** the traditional mode of conventional education system. Educational institutes should capitalize this chance to **renovate itself** by updating Curriculum, collaborating with other institutions, skill development and faculty improvement programme, centering on internationalizing higher education. This is the time to merge the traditional education system to digital education in India. This may allow inclusive education by facilitating learning across different geographies in India.

Ahead of crisis-related research, there are other areas that require the capabilities of higher education to produce new knowledge and develop renewed capabilities. One of them is education. During the crisis, it is not possible to quantify the learning from the pedagogical to the economic, psychosocial, etc. Undoubtedly, in the future it will be possible to take advantage of the acquaintance gathered in the crisis. It would help us to **build up an early warning system** to foresee and mitigate the impact of crises such as this on education and student learning, teachers and the systems themselves.

The effect of school closures is not just about education; they are multifarious. Meanwhile, Government schools and colleges, especially in rural areas, did not even have access to education due to the lockdown. According to the **Key Indicators of Household Social Consumption on Education in India report, based on the 2017-18 National Sample Survey**, less than 15% of rural households have Internet. A mere 13% of people surveyed (aged above five) in rural areas and just 8.5% of females could use the Internet.

THE DIGITAL DIVIDE	
Rural households with computer	4.4%
Urban households with computer	23.4%
Rural households with Internet	14.9%
Urban households with internet	42%

Source: Key Indicators of Household Social Consumption on Education in India report, National Sample Survey (2017-18)

We knew that everything was happening for the security and benefit of the students so that they remain safe at home without getting affected by the covid-19 virus. We were not ready for this, but it came, so we had to go through this, but we have to update and upgrade the infrastructure and should think of ways to undertake the situation and providing education to every child amid the pandemic and learn lesson from this experience which will be helpful in the future to aid the forthcoming generation.

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Service Quality in Banks: A Study of Public and Private Sector Banks

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ABSTRACT

The research was necessary to carry out as the changing global scenario demands it. After the start of liberalization era, it became a necessity for every banking company whether public or private, to shape its services into a global way. The research highly focuses on identification of problems regarding the marketing of banking services and customer satisfaction issues. Additionally, the study also critically analyse the banking services provided by the public and private sector banks to their customers to face the challenging competitive environment. It is essential for the banking players to adopt various changes in the delivery pattern and the quality of services. Both private and public sector banks need to provide quality services by enhancing the level of satisfaction of their customers

1. INTRODUCTION AND REVIEW OF LITERATURE

To define the perception of quality banking services in both the private and public sector bank with respect to the demographic variables such as age gender income and occupation with special reference to Punjab India, it can be said that satisfaction as a post-choice of a relative judgment of a specific transaction. It is totally based on the customer's perception of the value received during transaction and relationship where the value equals to perceive the service quality related to price and customer acquisition cost (Hallowell, 1996; Blanchard and Galloway, 1994). On the other hand, the customer loyalty is defined as a commitment to continue the purchasing a particular product and services that highly preferred by the customer which is totally based on the situation and factors in marketing efforts that Highly Effective switching behaviour of the customers. Loyalty is also known as a customer's commitment to do business in a given organization to purchase goods and services continuously and recommend them to their relatives, friends, colleagues (Chiguvi, 2016, Mellroy and Barnett, 2000).

To examine the perception of quality banking services in both private and public sector bank there is the various role of motivating variables that Highly Effective Quality Services given by the banks.

There are a number of definitions for the term Quality defined by various authors. Quality can be described generally as an edge or excellence. In literature, Teas, 1993, Brady and Cronin, 2001, have discussed the concern on how the service quality should be restrained. The previous researches suggests that customer does not perceive quality as a one-directional concept.

In addition, there is no consensus about how to access the service quality. The concept of service quality is most deliberated subject in service literatures due to lack of agreement. , Quality assessment not solely focuses on consequence of service. It is a result of diverse perception of the customer and integrity of the provider both. This idea is commonly accepted that services are evaluated both by production, outcome and delivery process.

Gronroos model divides customer's perception about the quality of a specific service into two dimensions. SERVQUAL has five quality attributes. Because services are nonphysical, it is hard to decide, record, compute or to test the service preceding to the sale in order to safeguard the quality on its delivery. In most services, quality occurs during service delivery, usually when customer and service employee interacts. Research reveals that delivering high service quality yields measurable remunerations in profit, cost cutting, and market share. Therefore, a considerateness of the nature of service quality and how it is attained in organizations has become a priority for research. For that, companies need to develop an atmosphere inside the organization that is more inclined towards attaining service quality standards according to the customer desires. There are number of organizations aggressively using some form of customer satisfaction measures in developing, monitoring, and/or evaluating product and service assistances, as well as for evaluating, motivating, and compensating employees.

2. SERVICE QUALITY REVIEWS OF INDIAN BANKS

Garvin, (1988); Albrecht and Zemke, (1985); Lehtinen and Lehtinen, (1991); Dabholkar et al., (1996) defined service quality as the difference between the customer expectations and service provider's team performance. It is known as multi-dimensional phenomena, which contain various dimensions, and the qualities that have been considered by a researcher as an attitude through the long-term and over an evolution of the performance. Quality in service is a concept, which is intangible in nature of the service offering, and it depends on the person

to person, situation to situation. To make a factor quality of services offered by the public-private sector bank in Punjab, it mainly includes five dimensions of service quality, which are as follows:

Tangibility: tangibility is known as things, which are physically observed by the customer in the bank branch, which mainly include the ATM, network, personal, physical facility, material, and net speed. It also includes the ability and skills of the personal quality of services offered by banks in the form of product and services, branch's care that represent tangible and include the concrete cues for the customer to evaluate the capability of the service provider. As a result, in Punjab tangibility in the form of physical observation in a banking branch was especially high in the private sector banks because they provide effectively and fast ATM services, network services and 70% only private sector bank in the form of tangibility because they do not face any kind of server issue for transaction failure issue as compared to the public sector banks. (Sahu & Sahu, 2016).

Reliability: Reliability is referred to as a trust in abilities of the company to performing a service in the right manner, which may include acting in their operations and promises, and as per the declaration. Reliable services in bankers mainly provide the internet connection without facing any kind of failure and recall the insured by the bank so that banker should not misuse the cardholder information and update their latest technology in a frequent manner. To analyse the reliability quality dimension in Punjab and making effective comparison between the public and private sector banks, it was observed that majority of the people highly favoured availability concerned with the private sector bank because people highly believe that the services and products offered by the public sector banks are most reliable as compared to the private sector banks because there are various fraud cases. Some of those cases are of Nirav Modi, Vijay Malaya that creates some doubts and conservations in the minds of the customers regarding the public sector banks for the quality of services and products.

Responsiveness: responsiveness is referred as a service provider's willingness to help the customers and provide effective services, which are measured by the amount of time needed to deal with the customers, report problem and duration to solve the customer's request. To make comparison between the public and private sector banks based on the responsiveness, it has been observed that in Punjab as compared to the public sector banks, private sector banks highly focused on the customer retention strategies. In this respect public-private sector banks highly operate their Customers Call Centre services and customer care services by which customers will be able to raise their disputes and complaints and come back after taking their complaints seriously and take the effective initiatives to solve their complaints effectively. (Sahu & Sahu, 2016).

Assurance: Assurance is related to the knowledge and currency of the employability to inspire trust and confidence. In respect to this, bankers always demonstrate assurance to the customer by adopting behaviour and providing essential knowledge to guide customers and handling their problems. As compared to the public and private sector banks, both the banks try to adopt the customer assurance by providing effective information about the latest schemes and update the customers about their periods and latest policies by providing messages text, emails and courier services. Therefore, in Punjab, both public and private sector banks try to ensure their customers and employees adopt the latest technology so that they were able to have confidence of their customers effectively.

Empathy: Empathy is caring for pain and concern of existing as well as potential customers individually by the service provider. It includes treatment given to the customers by keeping in view their complete background. The banker who has only focus on the personalized attention on customer's understanding, the specific need of the customer is not the requirement. As a result, in Punjab the public sector banks are facing the important issue because they were not so updated about the latest technologies. Therefore, they are facing the retaining issues of the customers as compared to the private sector banks. Private sector banks due to their philosophy, trust with updated technology are able to retain the customer as compared to the public sector banks (Sahu & Sahu, 2016).

3. OBJECTIVE AND METHODOLOGY OF THE STUDY

- To examine and compare the existing service quality aspects in the public sector and private sector banks

4. DATA ANALYSIS

A well framed questionnaire was distributed amongst the customers of selected Public and Private sector bank customers. The collected information is tabulated and results are drawn as follows:

4.1 Service Quality in Private Sector Banks

From the following table, we observed that 31.8% of the respondents from the selected population has said that, they are very satisfied with the time taken for opening bank account is less. The following bar chart also shows taller bar corresponding to the same.

Table 4.1.1: Time Taken in the Opening Bank Account is less

	Frequency	Percent	Cumulative Percent
Very satisfied	159	31.8	31.8
Satisfied	146	29.2	61.0
Neutral	87	17.4	78.4
Dissatisfied	42	8.4	86.8
Very dissatisfied	66	13.2	100.0
Total	500	100.0	

4.1.2 Speedy Withdrawal

From the following table, we observed that 33% of the respondents from the selected population has said that they are satisfied with speedy withdrawal service. The following bar chart also shows taller bar corresponding to the same.

Table 4.1.2: Speedy Withdrawal

	Frequency	Percent	Cumulative Percent
Very satisfied	156	31.2	31.2
Satisfied	165	33.0	64.2
Neutral	104	20.8	85.0
Dissatisfied	23	4.6	89.6
Very dissatisfied	52	10.4	100.0
Total	500	100.0	

4.1.3 Speedy Money Deposit

From the following table, we observed that 33.6% of the respondents from the selected population has said that they are very satisfied with speedy money deposit service. The following bar chart also shows taller bar corresponding to the same.

Table 4.1.3: Speedy Money Deposit

	Frequency	Percent	Cumulative Percent
Very satisfied	168	33.6	33.6
Satisfied	107	21.4	55.0
Neutral	81	16.2	71.2
Dissatisfied	95	19.0	90.2
Very dissatisfied	49	9.8	100.0
Total	500	100.0	

4.1.4 Cash Credit Facility is easily available

From the following table, we observed that 26.6% of the respondents from the selected population has said that they are very satisfied with Cash credit facility service. The following bar chart also shows taller bar corresponding to the same.

Table 4.1.4: Cash Credit Facility is Easily Available

	Frequency	Percent	Cumulative Percent
Very satisfied	128	25.6	25.6
Satisfied	133	26.6	52.2
Neutral	103	20.6	72.8
Dissatisfied	104	20.8	93.6
Very dissatisfied	32	6.4	100.0
Total	500	100.0	

4.1.5 Services are provided as Promised

From the following table, we observed that 32.6% of the respondents from the selected population has said that they are neutral with Services are provided as promised. The following bar chart also shows taller bar corresponding to the same.

Table 4.1.5: Services are Provided As Promised

	Frequency	Percent	Cumulative Percent
Very satisfied	134	26.8	26.8

Satisfied	89	17.8	44.6
Neutral	163	32.6	77.2
Dissatisfied	39	7.8	85.0
Very dissatisfied	75	15.0	100.0
Total	500	100.0	

4.1.6 Employees Have Good Knowledge and Revert Back With Courtesy

From the following table, we observed that 33.8% of the respondents from the selected population has said that they are satisfied with employees have good knowledge and revert back with courtesy. The following bar chart also shows taller bar corresponding to the same.

Table 4.1.6: Employees Have Good Knowledge and Revert Back With Courtesy

	Frequency	Percent	Cumulative Percent
Very satisfied	161	32.2	32.2
Satisfied	169	33.8	66.0
Neutral	138	27.6	93.6
Dissatisfied	11	2.2	95.8
Very dissatisfied	21	4.2	100.0
Total	500	100.0	

4.1.7 Individualized Attention is Provided by the Bank

From the following table, we observed that 29% of the respondents from the selected population has said that they are satisfied with individualized attention is provided by the bank. The following bar chart also shows taller bar corresponding to the same.

Table 4.1.7: Individualized Attention is provided by The Bank

	Frequency	Percent	Cumulative Percent
Very satisfied	121	24.2	24.2
Satisfied	145	29.0	53.2
Neutral	64	12.8	66.0
Dissatisfied	71	14.2	80.2
Very dissatisfied	99	19.8	100.0
Total	500	100.0	

4.1.8 Updated Physical Facilities

From the following table, we observed that 37.2% of the respondents from the selected population has said that they are neutral with updated physical facilities. The following bar chart also shows taller bar corresponding to the same.

Table 4.1.8: Updated Physical Facilities

	Frequency	Percent	Cumulative Percent
Very satisfied	161	32.2	32.2
Satisfied	87	17.4	49.6
Neutral	186	37.2	86.8
Dissatisfied	66	13.2	100.0
Total	500	100.0	

4.1.9 Employee Understands the Specific Needs of the Customers

From the following table, we observed that 31.2% of the respondents from the selected population has said that they are very satisfied with employee understands the specific needs of the customers. The following bar chart also shows taller bar corresponding to the same.

Table 4.1.9: Employee Understands The Specific Needs of the Customers

	Frequency	Percent	Cumulative Percent
Very satisfied	156	31.2	31.2
Satisfied	137	27.4	58.6
Neutral	113	22.6	81.2
Dissatisfied	57	11.4	92.6
Very dissatisfied	37	7.4	100.0
Total	500	100.0	

Service Quality in Public Sector Banks

4.2.1 Time Taken in the Opening Bank Account is Less

From the following table, we observed that 23.6% of the respondents from the selected population has said that they are dissatisfied with time taken in the opening bank account is less. The following bar chart also shows taller bar corresponding to the same.

Table 4.2.1: Time Taken in the Opening Bank Account is Less

	Frequency	Percent	Cumulative Percent
Very satisfied	86	17.2	17.2
Satisfied	93	18.6	35.8
Neutral	110	22.0	57.8
Dissatisfied	118	23.6	81.4
Very dissatisfied	93	18.6	100.0
Total	500	100.0	

4.2.2 Speedy Withdrawal

From the following table, we observed that 43.4% of the respondents from the selected population has said that they are dissatisfied with speedy withdrawal services. The following bar chart also shows taller bar corresponding to the same.

Table 4.2.2: Speedy Withdrawal

	Frequency	Percent	Cumulative Percent
Very satisfied	72	14.4	14.4
Satisfied	53	10.6	25.0
Neutral	79	15.8	40.8
Dissatisfied	217	43.4	84.2
Very dissatisfied	79	15.8	100.0
Total	500	100.0	

4.2.3 Speedy Money Deposit

From the following table, we observed that 39.4% of the respondents from the selected population has said that they are dissatisfied with speedy money deposit services. The following bar chart also shows taller bar corresponding to the same.

Table 4.2.3: Speedy Money Deposit

	Frequency	Percent	Cumulative Percent
Very satisfied	59	11.8	11.8
Satisfied	84	16.8	28.6
Neutral	110	22.0	50.6
Dissatisfied	197	39.4	90.0
Very dissatisfied	50	10.0	100.0
Total	500	100.0	

4.2.4 Cash Credit Facility is easily available

From the following table, we observed that 39.4% of the respondents from the selected population has said that they are dissatisfied with cash credit facility services. The following bar chart also shows taller bar corresponding to the same.

Table 4.2.4: Cash Credit Facility is Easily Available

	Frequency	Percent	Cumulative Percent
Very satisfied	91	18.2	18.2
Satisfied	29	5.8	24.0
Neutral	29	5.8	29.8
Dissatisfied	120	24.0	53.8
Very dissatisfied	231	46.2	100.0
Total	500	100.0	

4.2.5 Services are provided as Promised

From the following table, we observed that 37.4% of the respondents from the selected population has said that

they are dissatisfied with services are provided as promised services. The following bar chart also shows taller bar corresponding to the same.

Table 4.2.5: Services Are Provided as Promised

	Frequency	Percent	Cumulative Percent
Very satisfied	68	13.6	13.6
Satisfied	29	5.8	19.4
Neutral	144	28.8	48.2
Dissatisfied	187	37.4	85.6
Very dissatisfied	72	14.4	100.0
Total	500	100.0	

4.2.6 Employees Have Good Knowledge and Revert Back With Courtesy

From the following table, we observed that 31% of the respondents from the selected population has said that they are very dissatisfied with employees have good knowledge and revert back with courtesy. The following bar chart also shows taller bar corresponding to the same.

Table 4.2.6: Employees Have Good Knowledge And Revert Back With Courtesy

	Frequency	Percent	Cumulative Percent
Very satisfied	80	16.0	16.0
Satisfied	81	16.2	32.2
Neutral	64	12.8	45.0
Dissatisfied	120	24.0	69.0
Very dissatisfied	155	31.0	100.0
Total	500	100.0	

4.2.7 Individualized Attention is Provided by the Bank

From the following table, we observed that 39.4% of the respondents from the selected population has said that they are dissatisfied with individualized attention is provided by the bank. The following bar chart also shows taller bar corresponding to the same.

Table 4.2.7: Individualized Attention is Provided by the Bank

	Frequency	Percent	Cumulative Percent
Very satisfied	64	12.8	12.8
Satisfied	52	10.4	23.2
Neutral	80	16.0	39.2
Dissatisfied	197	39.4	78.6
Very dissatisfied	107	21.4	100.0
Total	500	100.0	

4.2.8 Updated Physical Facilities

From the following table, we observed that 42.8% of the respondents from the selected population has said that they are very dissatisfied with updated physical facilities. The following bar chart also shows taller bar corresponding to the same.

Table 4.2.8: Updated Physical Facilities

	Frequency	Percent	Cumulative Percent
Very satisfied	87	17.4	17.4
Satisfied	61	12.2	29.6
Neutral	113	22.6	52.2
Dissatisfied	25	5.0	57.2
Very dissatisfied	214	42.8	100.0
Total	500	100.0	

4.2.9 Employee Understands the Specific Needs of the Customers

From the following table, we observed that 44.6% of the respondents from the selected population has said that they are dissatisfied with employee understands the specific needs of the customers. The following bar chart also shows taller bar corresponding to the same.

Table 4.2.9: Employee Understands the Specific Needs of the Customers.

	Frequency	Percent	Cumulative Percent
Very satisfied	62	12.4	12.4
Satisfied	52	10.4	22.8
Neutral	68	13.6	36.4
Dissatisfied	223	44.6	81.0
Very dissatisfied	95	19.0	100.0
Total	500	100.0	

CONCLUSION AND SUGGESTIONS

In India, Banking sector is considered to be a pure financial service sector that plays an important role in boosting an economy's growth potential. There is a co-existence between Private and Public banks where both are rendering financial services. The policies, strategies and working in Private and Public banks are different that leads variation in the customers' satisfaction level and service quality. This paper tries to measure satisfaction level and loyalty of customers of Public and Private Banks in Punjab and factors responsible for variation in service quality between Private and Public banks in India. A comparative study is done between Public and Private Banks where we try to establish a relationship between service quality aspects and customer satisfaction towards the subsequent banks. It is to be kept in mind that such a difference may also be an outcome of different socio economic and demographic factors. This research is based on primary information obtained from 500 selected customers of Public and Private sectors banks in Punjab.

This leads us to our findings i.e., there is a significant difference in customer satisfaction and the level of satisfaction is more in case of Private bank because of their ever evolving tangible services, better equipped with latest technology, developed infrastructure, well trained employees, convenient office hours and locations of the branches. The critical factors of dissatisfaction among customers in public sector banks are poor infrastructural facilities, enquiry counter and front office services. Private sector banks are trying to evolve their pure banking services by recruiting skilful youths which are in stark contrast to the workforce in public banks which comprises more employees in the higher age bracket. Thus, a tendency to deploy some social responsibilities. Public sector banks are characterised by slow services and low knowledge of banking products which have a negative impact on the satisfaction level of the customers. Public sector banks should work to attain the confidence of salaried class, lower age group customers, students and self-employed businessman people by evolving their banking services with improved technology and betterment in workforce. Along with this, the customers of Public sector banks are not satisfied with the interrupted services of ATMs and are not assured about the safety of charging service charges and inefficient services of the banks' staff. The ATMs of Public sector banks are always crowded. Infrastructural improvements should be made with respect to establishment of new ATMs of Public banks at more convenient and easily reachable places.

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Emotion Recognition through Speech: A Review

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ABSTRACT

Speech is the most commonly used method of communication. Speech contains lots of information about a person's behavioural cues and psychological information. Using speech a person not only communicates the thoughts using words but also the emotion behind them. Emotion recognition using speech is the most powerful and reliable methodology. The proposed system uses Mel Frequency Cepstral Coefficients method for extracting features and training the model for recognizing the intended emotion behind speech. This system can detect seven basic emotions from the auditory data.

INTRODUCTION

With the advancements and use of technological devices Human Computer Interaction is implemented in many areas. The most effective method of interaction is using speech. Speech is an important medium in which users communicate with each other. Expressions of thought is most commonly done using speech which depicts a persons' emotion. Emotions change according to the situations humans face while living and dealing with each other, while someone's behaviour can affect someone else's behaviour. This happens when the emotions are expressed. Emotion recognition using speech is challenging as we need to analyse the voice as well as the underlying emotion of the person. Emotions are vital for cognitive science and decision making, so study of emotions will have a wide array of applications like robotics, medical science etc. The main objective is to impersonate human perception for developing an efficient emotion recognition system. Emotion Recognition system will analyse speech signal for speech recognition. This system has a collection of different classes by describing what types of expressions they have the ability to recognize. Speech emotion recognition system can be of great use in Human Robot Interaction as robots will be able understand and analyse the human speech in an efficient manner. The major challenges of recognizing speech emotion recognition is in the fact that emotions may differ according to the environment, culture and reactions to particular situations.

LITERATURE REVIEW

Extensive research has been done using auditory data to detect the emotions behind spoken words. Emotion detection can be performed using facial emotion detection, voice, gesture recognition, heartbeat, etc., but voice is the most common. Emotions fall into two categories: discrete and dimensional. Individual emotions were introduced by Ekman. These are the six basic emotions of joy, anger, sadness, surprise, fear, and disgust, and can be thought of as the basic emotions of other complex and complex emotions. To recognize emotions from speech, we need to extract them from the size of the selected speech and classify them appropriately. Many techniques have been used to extract the appropriate data from audio signals. Many researchers have proposed the following functions of voice emotion information. B. Energy, pitch, formant frequency, linear predicted cepstrum coefficient, mel frequency cepstrum coefficient, and spectral modulation function. The Mel Frequency Cepstrum Coefficient (MFCC) feature extraction method provides the highest accuracy of any database.

Ali Hasan and Rober Damper [1] in their work had attempted to extend binary support vector machine in to multi class classification for recognition of emotion from speech. The work used three selected databases and applied two schemes involving hierarchy of classifiers where every class tries to make binary decision on class membership. The authors used Open EAR toolkit to extract more than 6000 features per speech sample which was a big achievement.

Noroozi et al. [2] proposed emotion recognition system based on speech and visual data. For visual data two strategies are considered first being facial landmark detection involving distance and angle are computed. Secondly they summarized each video in a compact set of pivot frames which are known for visually distinguishing the emotions. Feature extraction used 88 features which were extracted using different methods. Principal component analysis was done to reduce the dimension of the extracted features. In the proposed system experimental work was done on the SAVEE, eNTERFACE'05, and RML databases which showed substantial performance improvement.

Fransesc Alias et al. [3] work on a novel idea of acoustic machine hearing and conducted a pertinent review of the most significant audio feature extraction techniques used to analyze the audio signals in the form of speech, music and environmental sounds. The paper explored the latest advances in the form of fresh bio-inspired proposals. The paper starts with a brief discussion of general sound classification theme, followed by general

architecture of a typical machine hearing system. Physical audio feature extraction techniques like time domain physical features, frequency domain physical features, wavelet based physical features, image domain physical features, cepstral domain physical features were described in depth. The perpetual audio feature extraction techniques are also deeply visited by the authors.

Abas Albahri, Margret Lech [4] focused on the fact that potential application of speech emotion recognition have substantial effect on accuracy of speech emotion recognition in terms of bandwidth restriction and compression techniques used by speech communication system. As a solution to this stated problem this paper works on the two factors affecting accuracy by experimenting on band limited speech and compressed speech. The modelling and classification of speech emotion was achieved using GMM classifier and speech features including MFCC, Glottal time and frequency domain parameters. Berlin emotional speech database for used with speech signals sampled at 16 kHz . The authors concluded that low speech frequency samples and high frequency components play an important role in Speech emotion recognition.

Patil et al. [5] has stressed the fact that speech emotion recognition has begun to benefit from the capabilities made available by deep learning in order to solve all main challenges in machine learning. Prior to the widespread use of deep learning, SER relied on approaches such as hidden Markov models (HMM), Gaussian mixture models (GMM), and support vector machines (SVM), as well as significant preprocessing and meticulous feature engineering. Deep learning has deeply affected the improving them up to 70% when controlled environment is implemented.

In controlled circumstances, the outcomes have improved from roughly 70% accuracy to the upper 90s, according to new literature.

Anuja Thakur and Sanjeev Dhull [6] in their work have discussed the process of speech emotion recognition along with different methods of pre-processing. The work also focuses on different extraction methods and classifiers used for speech emotion recognition. Authors first have discussed about different emotion speech databases for different languages like German, English and Indian. As a second step towards speech emotion recognition different noises like echo, reverberation, interference etc are discussed which should be removed in pre-processing. And in the third step authors have made an attempt to discuss all the feature extraction techniques to extract features like prosodic, spectral and combination of both. In the last step the work has discussed all the classifiers used like ANN, KNN, Naive Bayes, Decision Tree, Support Vector Machine, Hidden Markov Model.

PROPOSED WORK

The proposed system uses convolutional neural network architecture for training to detect emotions from speech data. One of the important considerations for the emotion recognition is the extraction of the suitable features, which state the emotion of the speaker. Extracting the features fills the research gap between the identification of different emotions in the speech signal.

FEATURE EXTRACTION

Using MFCC

Mel Frequency Cepstral Coefficient (MFCC) is the most important and effective method of feature extraction for auditory data. Feature extraction aims to reduce the data by transforming the input signal into a compact set of parameters while preserving the spectral and/or temporal features of the speech signal information.

The Detail of Block Diagram of Feature Extraction is as Follows:

- 1) Framing - It is the process of segmenting the speech sample into various frames. The speech samples obtained from the analog form is converted to digital. As the human voice is of variable length, framing is necessary to define the dimension of speech.
- 2) Windowing - Windowing function is performed to curtail the signal cutoffs at the start and end of each frame. Hamming window is a decent choice for windowing.
- 3) Fast Fourier transform (FTT)- FFT generates the frequency spectrum of each frame fixed during framing. Each sample is then converted from time domain to frequency domain. FFT can identify the frequency.
- 4) Mel scale filter bank - The mel scale filter bank gives the amount of energy that exists in particular frame.
- 5) Log energy computation- After the filter bank energy logarithm of these is taken. It is also motivated by human hearing as a human cannot listen high volume on linear scale. compression operation is used to perform this conversion.

6) DCT- The last step is to compute the DCT of the log filter-bank energies. The energies of the filter bank correlate with each other due to overlapping of the filter bank. The diagonal covariance matrices is used here to model the features.

7) Cepstral mean correction- The cepstral mean correction was applied to compensate for distortion by subtracting the cepstral mean of a frame from the cepstral coefficients for additional robustness in recognition

Datasets Used

In the proposed system four different datasets were used to detect the appropriate emotion which are described below.

1. Ryerson Audio-Visual Database of Emotional Speech and Song (RAVDESS) [7] This is one of the benchmark dataset used in Speech emotion recognition. The files in the RAVDESS contains 1440 files which contains 24 professional actors (12 female, 12 male), vocalizing two lexically-matched statements in a neutral North American accent. Speech emotions includes calm, happy, sad, angry, fearful, surprise, and disgust expressions. Each expression is produced at two levels of emotional intensity (normal, strong), with an additional neutral expression.

2. Crema-D

CREMA-D is a data set of 7442 original clips from 91 actors. These clips were from 48 male and 43 female actors between the ages of 20 and 74 coming from a variety of races and ethnicities. Actors spoke from a selection of 12 sentences. The sentences were presented using one of six different emotions and four different emotion levels (Low, Medium, High, and Unspecified). [8]

3. Toronto Emotional Speech Set (Tess)

In this dataset there are a set of 200 target words were spoken in the carrier phrase "Say the word '_' by two actresses and recordings were made of the set portraying each of seven emotions (anger, disgust, fear, happiness, pleasant surprise, sadness, and neutral). There are 2800 data points (audio files) in total. The dataset is organized such that each of the two female actor and their emotions are contain within its own folder. And within that, all 200 target words audio file can be found. The format of the audio file is a WAV format. [9]

4. Surrey Audio-Visual Expressed Emotion (Savee)

The SAVEE database was recorded from four native English male speakers (identified as DC, JE, JK, KL), postgraduate students and researchers at the University of Surrey aged from 27 to 31 years. Emotion has been described psychologically in discrete categories: anger, disgust, fear, happiness, sadness and surprise. A neutral category is also added to provide recordings of 7 emotion categories. [10]

Convolution Neural Network

Motivated by the Convolution Neural Network model, which outperformed ML models for the Speech emotion recognition task, we build a CNN model to recognize the underlying emotion of the speech signal.

The work uses 4 convolutional layers in the CNN model together with 2 fully-connected (FC) layers followed by a SoftMax layer. The convolutional layers aim to learn feature representations of the data given to the model. Each convolutional layer is composed of several convolutional kernels used to compute different feature maps. Our new feature map can be obtained by first convolving the input with the learned kernel and then applying element-wise non-linear approximation on the convolved output. Mathematically, the feature map at the location (i,j) is defined as:

$$F_l f(i, j) = W_l f(i, j) \times x_l(i, j) + b_l f, \quad (2)$$

where F is a feature map computed for location (i,j), $W_l f(i, j)$ is the weight matrix of the kernel centered at the (i,j) location of the l th layer, $x_l(i, j)$ is the input feature vector and $b_l f$ is the bias for the feature map at l th layer. The number of kernels used in each of the 4 convolutional layers is 32, 64, 128, 256 followed by 128 and 32 hidden neurons at the FC layers. The FC connected layers learn the relationship between the given input to the output. To mitigate the overfitting issue in the model, we add dropout layers to the CNN model and include early stopping is included in the training process. Furthermore, after each convolutional layer, we used batch normalization and max-pooling layers to subsample the feature dimensions. To learn the representative features to a larger context, we incorporate kernels of different sizes into the convolutional layers of the CNN model. The typical kernel sizes that we use are 7×7 , 5×5 , 3×3 , and 1×1 . The CNN model expects fixed-dimension inputs, we extract speech features for the first 200 frames. Longer signals are cut down to 200 frames and shorter signals are padded with zeros. During training, we augment the CNN model by extracting additional features using multiple windows. All the extracted features are fed to the CNN model to learn the most

representative features for SER analysis. Finally, the emotion class is predicted using a final SoftMax layer, which is applied to the vector generated from the FC layer.

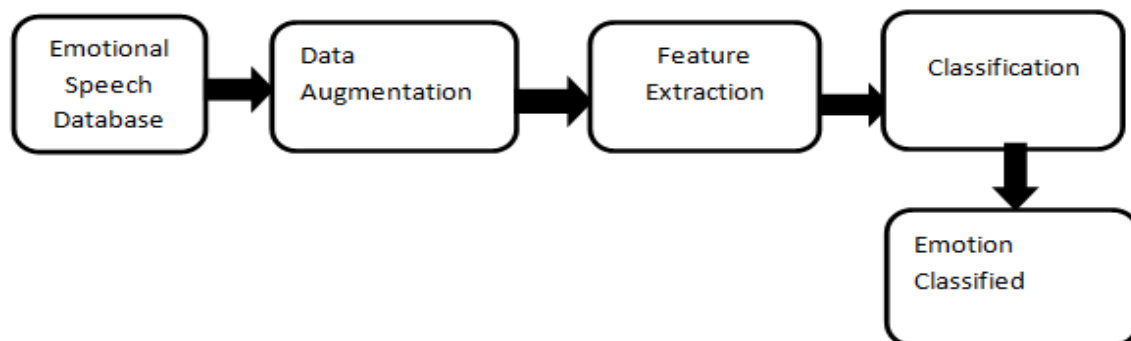


Fig. 1. Block Diagram of system

Experimental Work

The most challenging part is choosing the emotion recognition database, categorizing different features related to speech, and selecting the most suitable classification model. Experimental work was done with respect to the number of convolutional layers and parameters such as kernel. The system included six Convolutional layers and flatten layers along with Softmax layer. MFCCs are given to the model and sampling is done to further map the low frequency group to high frequency. After training the model to 50 epochs the accuracy of the system was 71.66 as shown in fig .

```
428/428 [=====] - 1/15 400ms/step - loss: 0.7952 - accuracy: 0.6899 - val_loss: 1.0497 - val_accuracy: 0.6070
Epoch 40/50
428/428 [=====] - 171s 399ms/step - loss: 0.7920 - accuracy: 0.6933 - val_loss: 1.0857 - val_accuracy: 0.5930
Epoch 41/50
428/428 [=====] - 172s 401ms/step - loss: 0.7930 - accuracy: 0.6930 - val_loss: 1.0578 - val_accuracy: 0.6026
Epoch 42/50
428/428 [=====] - 169s 395ms/step - loss: 0.7604 - accuracy: 0.7067 - val_loss: 1.0728 - val_accuracy: 0.6034
Epoch 43/50
428/428 [=====] - 171s 399ms/step - loss: 0.7616 - accuracy: 0.7015 - val_loss: 1.0822 - val_accuracy: 0.6018
Epoch 44/50
428/428 [=====] - 170s 397ms/step - loss: 0.7678 - accuracy: 0.7012 - val_loss: 1.0894 - val_accuracy: 0.6041
Epoch 45/50
428/428 [=====] - 170s 398ms/step - loss: 0.7390 - accuracy: 0.7157 - val_loss: 1.0795 - val_accuracy: 0.6116
Epoch 46/50
428/428 [=====] - 173s 404ms/step - loss: 0.7504 - accuracy: 0.7120 - val_loss: 1.0666 - val_accuracy: 0.6101
Epoch 47/50
428/428 [=====] - 169s 395ms/step - loss: 0.7320 - accuracy: 0.7217 - val_loss: 1.0773 - val_accuracy: 0.6112
Epoch 48/50
428/428 [=====] - 169s 395ms/step - loss: 0.7097 - accuracy: 0.7227 - val_loss: 1.1189 - val_accuracy: 0.6119
Epoch 49/50
428/428 [=====] - 169s 394ms/step - loss: 0.7093 - accuracy: 0.7292 - val_loss: 1.1083 - val_accuracy: 0.6046
Epoch 50/50
428/428 [=====] - 169s 396ms/step - loss: 0.7312 - accuracy: 0.7166 - val_loss: 1.1037 - val_accuracy: 0.6134
```

Fig. 2: Model Is Trained

The dataset was divided into training and testing data to evaluate the performance of the system. The overall accuracy of training and testing data indicated that the model showed the accuracy of the model on test data was 61.33.

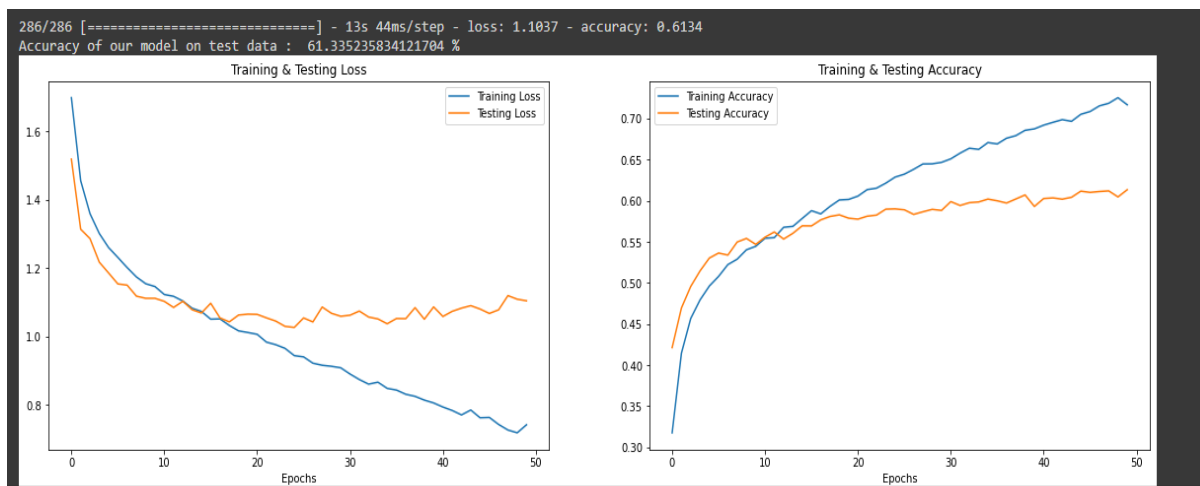


Fig 3: Graph of training vs testing accuracy

Fig. no. 3 shows the precision, recall, f1-score and support value for each emotion detected along with the accuracy of each emotion detected. It had been observed that the precision value of surprise and angry showed significantly good results. The system got confused between few emotions such as fear and surprise.

	precision	recall	f1-score	support
angry	0.78	0.71	0.74	1434
calm	0.52	0.64	0.57	135
disgust	0.56	0.46	0.50	1411
fear	0.66	0.55	0.60	1451
happy	0.53	0.61	0.57	1511
neutral	0.52	0.60	0.56	1243
sad	0.60	0.66	0.63	1463
surprise	0.79	0.88	0.83	474
accuracy			0.61	9122
macro avg	0.62	0.64	0.63	9122
weighted avg	0.62	0.61	0.61	9122

Fig 4. Precision Table

CONCLUSION

In the proposed model, an attempt was made to solve the problem of emotional speech recognition. The system cleans up the data set by generating a spectrometer from the speech signal and expanding the data before feature extraction. Various feature extraction methods such as Mel-Frequency Cepstral Coefficients (MFCC) and Zero Crossing rate were used for feature extraction. The ability to classify emotions was introduced into the sequence model. The experimental results show that the proposed approach is superior to other approaches in terms of emotion recognition results. The experiments show that the proposed approach achieves state of the art results on the dataset. The proposed model can be used in various applications where emotions play an important role such as interactive chatbots, robots, etc., where the revelation of emotions and moods hidden in language can play a role in enhancing conversation. Combination of different emotional features give different emotion detection rate. The researchers are still debating for what features influence the recognition of emotion in speech. To achieve greater accuracy, more features can be combined.

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Quest for Identity in Chimamanda Ngozi Adichie's *Americanah* (2013)

Shahnaz Choudhary and Sakshi Singh

ABSTRACT

The purpose of the paper is to analyze the predicaments of racially segregated people and how their segregation led to identity crisis with reference to Chimamanda Ngozi Adichie's fictional novels *Americanah* (2013). Through the application of Critical Race Theory (CRT), the study aims to uncover the racial discrimination and identity crisis that Blacks faced. The world is currently undergoing an interminable crisis, that is, the racial abuse crisis. The current state of Blacks in America is about improving the psychological orientation of the human race, black and white alike, there is a need to see and evaluate every human on the basis of their character and skill rather than their skin colour. The novel deals with the racial abuse crisis that has simply shifted from the common whites versus colored to one ethnic group versus another ethnic group within a group of people of the same color over the years. The main focus of the paper is to learn more about these people's experiences and how they have been affected by racial stereotypes in the culture and how they can use their voices to combat discrimination. It also explores how racism still continues to be a powerful force in American culture.

INTRODUCTION

Racism is defined as the marginalization and oppression of a particular community or a group based on the color of their skin or made them feel like they are inferior because they lack something either naturally or according to the societal norms build or constructed against them¹. Racism has many form, it encompasses discrimination, prejudice or hatred. It may be because of their color, their nationality, it may be due to their ethnicity or anything by which hatred for someone can be directed. It holds many types or forms and it can be casual, direct or systematic racism. Causal racism can also be called as indirect racism. It is a type of racism which an individual unconsciously and unintentionally perform by his actions. For example making fun of someone's background if an individual belong to lower strata of society. Another example is when another person alienate a person from a group because of individual's skin color. Direct racism is when consciously and intentionally racism is being performed. Then came systematic racism which is defined as when racism is practiced by different type of institutions be it school, media, government, hospitals where a particular community or group of people who shared common physical traits are mistreated came under this type of racism². And all such practices of racism gave rise to racial segregation and a feeling of lost identity is faced by an individual in a society.

Due to the assignment of a particular race to a particular group in a society, the individuals of that particular race encounter racism and finally they are being segregated racially. Racial segregation is defined as the segregation or separation or restriction of facilities from public sector (transportation, education, employment, medical facilities etc.) to a particular community on the basis of racial differences. This segregation is quite prevalent in American society and is usually done against blacks by whites and in fact the racial segregation is not very Racial segregation, Identity crisis all these concepts take birth from one thing that is associated with it and that is race which is both a social as well as a biological construct or which can also be refer as human categorization. It is a biological construct on the basis of what are the particular traits a race carry. It might be their skin color, their hair texture, facial features, their height and other characteristics. And is a social construct on the basis of when a society assign that a particular group is called a particular race because they shared common culture, belong to a particular geographical region, have common language and religion etc³. Previously, the term Racism was used to describe persons who speak the same language or who are speakers of the same language. Then it refers to those who are members of the same nation later on. By the seventeenth century, the phrase had come to denote to people with similar physical characteristics. As a result, racism is born from these manufactured images of race same nation.

¹ "Racism," Anti-Defamation League (Organization ADL, 605 Third Avenue, New York, July 2020), <https://www.adl.org/racism>.

² "Understanding Racism and How to Spot It," The big issues | Reach Out Australia, [https:// au.reachout.com/articles/ what-is-racism-and-how-to-spot-it](https://au.reachout.com/articles/what-is-racism-and-how-to-spot-it).

³ "Lemuel Shaw," Encyclopaedia Britannica (Encyclopaedia Britannica, inc.) [https:// www.britannica.com/biography/ Lemuel-Shaw](https://www.britannica.com/biography/Lemuel-Shaw).

When the people of a particular race or community are racially segregated they feel certain kind of identity crisis or identity lost. Identity itself is a word which conveys meaning of its own. Identity is a person's realization and understanding of his thoughts and feelings of one own self as an individual, according to psychological perspective but according to sociological perspective an individual identity is from which group he belongs or what are the certain characteristics features which make an individual part of that particular group.

The term identity has been derived from the French word *identite* which has its linguistics root in the word *identitas* which itself is a Latin noun and *-titas* is a derivation brought from Latin adjective *idem* which means "the same". The term identity crisis was coined by theorist Erik Erikson. According to Erik Erikson, it is a time when individual start an intensive analysis of himself and start exploring his ways of looking at oneself. His interest in identity crisis developed by reading Anglican novels. Identity crisis is also defined as when one get confused with accepting his personality and find rejecting his own self not only by him but by others also.¹

REVIEW OF LITERATURE

Camille Zubrinsky Charles in the research paper "The Dynamics of Racial Segregation" discusses how at the end of the twentieth century majority of people of colour were racially segregated because of increased immigration to metropolitan cities and also how racial residential segregation leads to racial differences and how individuals are segregated from public and private sphere and how even the largest areas considered as urban. In this paper he majorly describes about Hispanic and Asian segregation by the people of west.²

Douglas S. Massey, Gretchen A. Condran and Nancy A. Denton in their journal "The Effect of Residential Segregation on Black Social and Economic Well-Being". This paper discusses about the effects of racial segregation on blacks. Regardless of how high a man of color's position has risen, he must manage with fewer resources, and racial segregation will always be a cause of stratification in American society. This paper also analysis about why blacks migrate from their homeland to make their lives better by attracting towards more availability of resources. This paper also discusses how a high status man prior to new place choose school for their children and how they choose to live in an area where the population of black should be less in number which indicates that they choose to live in an area which are basically areas with superior quality.³

Mark Beeuwkes in the masters thesis defines racism for a white liberal audience that how institutional levels are responsible for operating racism and he define about race in it because race in America is not seen from the lens of institutional affects rather it is seen as if individuals are responsible for promoting it, not the institutions and thus influence the reader to broader its lens of race taking all layers of society. This thesis also discusses how white supremacy dominate through forming structure that sustain racism. In the thesis, it has also been discussed that how racism leads to the creation of dominant and minority groups and how it benefits white people in society and how dominant and minority groups raise their voice against racism in American context and people of color are being discriminated in America as a group of minority and how people of both color being equally skilled when appear for employment and out of them white are hired for work but blacks are being discriminated there also.⁴

Niyi Akingbe and Emmanuel Adeniyi in their research paper "Reconfiguring Others and Negotiating Identity" argue that transculturalism is the root cause of lost identity or simply it leads to identity crisis. An interview of Coleman has been conducted by Ven Begamurde and it is believed that he has coined the term "transculturalism" and he assumes that there is a process of change and of evolution which is necessary among different cultures and that eventually we stop being Indo-Canadian, or Ukranian -Canadian, we simply become human. He explained this very concept by relating it with the concept of nomadism that nomads usually do not consider a particular place as their home, they switch on from one place to another and thus encounter different culture, situations and lifestyles and adjust themselves accordingly. Thus he uses nomads as a metaphor for

⁴ Kanak Lata Tiwari, "Academic Journals - International Journal of English and Literature," Academic Journals - Home (ISSN 2141-2626 © 2013 Academic Journals, December 12, 2013), <https://academicjournals.org/ijel>.

⁵ Camille Zubrinsky Charles, "The Dynamics of Racial Residential Segregation," Annual Review of Sociology 29, no. 1 (June 4, 2003): pp. 167-207, <https://doi.org/10.1146/annurev.soc.29.010202.100002>.

⁶ D. S. Massey, G. A. Condran, and N. A. Denton, "The Effect of Residential Segregation on Black Social and Economic Well-Being," Social Forces 66, no. 1 (January 1987): pp. 29-56, <https://doi.org/10.1093/sf/66.1.29>.

⁷ Gökçen KARA, "Racism In Chimamanda Ngozi Adichie's Americanah," Journal Of Academic Social Resources 6, no. 23 (January 2021): pp. 315-320, <https://doi.org/10.31569/asrjournal.188>.

immigrants that they should not resist change rather try to adjust with it. This paper also throws light on how much hatred the inhabitants hold for immigrants and at every point made them realize as they are something else called “others”.¹

Jack Taylor in his research paper “Race and Identity” discusses how even language plays a significant role in promoting race, racism and how issues of identity take birth because of all of this. This paper also explores that how previous identity of an individual lost when he or she adopts a new cultural habits or encounter a new culture altogether and the individual feels like how different they have become from their previous self by adopting a new culture and they have left their own culture behind. This paper also discusses how one language which is English is responsible for splitting of identity of an individual. In *Black Skin White Masks* Frantz Fanon also make his point on the issue that how language is responsible for suppression of culture and how is used as a political strategy to colonized the suppressed one.²

Elcanor Annch Dasi in research paper “The intersection of Race, Beauty and Identity” explains that lost identities are always linked to past times either by colonialism, slavery practices, cultural or racial differences and it can be anything which leaves a landmark in the history. He also discusses that migration is also one of the emerging trend which became a cause in the rise of new identities or hybrid or mixed identity. He also discusses about how beauty is also linked with the representation of identity. He also throws light on how blackness has always been presented commonly as subjugated. This paper also discusses how same individual lost its identity only on the basis of external looks by which others identify them and how they face the new world filled with race despite being from the background where they have never faced such thing and how the inferiority and superiority complex still prevails between the two cultures western and African cultures.³

RESEARCH METHODOLOGY

The present research is intended to unearth the racial segregation and identity crisis that blacks faced through the use of critical race theory (CRT).

CRT, helps us understand how sufferers of organized racism are affected by cultural observations of race and how they are able to characterize themselves to counter preconception by emerging out of identity crisis to embrace black as their identity. Cultural Race Theory emerge in the mid 1970's in the writing of numerous American scholars who argues that social problems are inclined and shaped by societal constructions and cultural norms rather than by specific individuals and psychological aspects.

Most famous CRT scholars such as Patricia William, Kimberle Crenshaw and Mari Matsuda show interest in identifying racism as a unremarkable section of American life. In doing so, they try to challenge the principles and practices that empower racism to continue while also inspiring these practices in order to pursue freedom from organized racism. Also the CRT researchers do not only pinpoint an individual's identity and understanding of the world in his or her ethnic identification but also their relationship to a specific gender, homeland, class, erotic orientation etc.

Richard Delgado and Jean Stefancic describe in their overview to the third publication of Critical Race Theory : *The Cutting Edge* that our societal biosphere with its rules, regulations, practices and obligation of status and authority, is not static, we construct with it arguments, stories and stillness. But we need not comply in activities that are partial and biased. Through writing and talking in contrast to them, we may anticipate to contribute to an improved, reasonable and open-minded world. Thus, CRT theory contributes to stress on social involvement and helps to change everyday conception of race, prejudice and authority.⁴

In the novel *Americanah*, the characters in the novel somehow feel identity crisis and racial segregation, thus with the help of these critiques and research methodology it would be analysed.

⁸Niyi Akingbe, “‘Reconfiguring Others’: Negotiating Identity in Chimamanda Ngozi Adichie’s *Americanah*,” *Rupkatha Journal on Interdisciplinary Studies in Humanities* 9, no. 4 (December 11, 2017), <https://doi.org/10.21659/rupkatha.v9n4.05>.

⁹Jack Taylor, “Language, Race, and Identity in Adichie's *Americanah* and Bulawayo's *We Need New Names*,” *Research in African Literatures* 50, no. 2 (2019): pp. 68-85, <https://doi.org/10.2979/reseafritelite.50.2.06>.

¹⁰Eleanor Anneh Dasi, “The Intersection of Race, Beauty and Identity: The Migrant Experience in Chimamanda Ngozi Adichie’s *Americanah*,” *Studies in Linguistics and Literature* 3, no. 2 (April 19, 2019): p. 140, <https://doi.org/10.22158/sll.v3n2p140>.

¹¹Richard Delgado, “Critical Race Theory: the Cutting Edge,” Amazon (Temple Univ. Press, 2013), <https://www.amazon.com/Critical-Race-Theory-Cutting-Edge/dp/1439910618>.

ANALYSIS

The novel *Americanah* by Chimamanda Ngozi Adichie throws light on the life of a young grownup girl, Ifemelu, who lives in Lagos, Nigeria. She has completed her higher education from the University of Nigeria, Nsukka and immigrated to United States to attend University and after immigration, what does the protagonist, an African girl, notice and feel when she discovers a new culture, American culture, and how does she cope with the tragedies and adventures of immigration, as well as all of the upheavals in her life. The protagonist in the novel is a blogger and it seems that the author uses it as a device to unveil the covered layer of race in America.

The novel begins when Ifemelu was waiting at the Princeton Junction Station for the train to have been to Trenton so that she can braided her hair because there is no hair braided salon in Princeton as she is now coming back to her hometown Nigeria. At the salon flashback of Ifemelu youth life came in the novel. Ifemelu's life in Nigeria is peaceful. She falls in love with Obinze in high school. When they finished secondary school, they both applied to the University of Nigeria in Nsukka, but the university lecturer was always on strike, causing the university to close, so her parents, Obinze and Aunt Uju, encouraged her to study abroad, and she accepted the offer and obtained an authorised student visa, allowing her to immigrate to the United States. The main theme which is being reflected throughout the novel is Identity and Racism and is reflected through the characters such as protagonist of the novel, Ifemelu, Obinze and Dike. These characters sometimes feel like they are bicultural and sometimes as lost identity because of racism in foreign countries like America and England but mostly probably in America.¹ Dominick La Capra is a Cornell historian who is interested in both history and historiography, particularly traumatic experiences, which he refers to as limit experiences, and how they connect to historical writing. In his book *The Bounds of Race*, he focuses a lot of attention on how the issues of race and language are intertwined, as Black people try to figure out how to tackle the enslavement and cruelty they've suffered.²

Ifemelu has two homes one in Nigeria and the other is in America and when she immigrated to U.S she finds that it's her being black that is sort of present and centered whereas in Nigeria she has never felt what actually being black meant. She is a blogger and in her blog post she writes about race in America. She once writes a blog post revealing how a Non-American black lost his/her identity in America because of racism there, "Dear Non-American Blacks, when you make the choice to come to America, "Stop arguing, I am Ghanaian, I am Jamaican, America doesn't care." You are Black in America. Through the post author want the reader to know that how can a person become different in different places only on the basis of identity, others label them based solely on one trait, in her instance, being black, but the protagonist never experienced what it was like to be black in Nigeria because that would not be possible because the majority of the people there look like her. Another incident involving Ifemelu occurred when she was in a hair braiding salon in Trenton. A hair braider asked Ifemelu if it was true that "Igbo marry Igbo always," to which she replied "from my sister," to which Ifemelu inquired, "Where is she?" Hair braider replied "In Africa," to which Ifemelu inquired, "Where?" In Benin, she replied in Senegal. Ifemelu then inquired as to why she mentioned Africa rather than the name of the country, to which she replied that if one says Senegal, Americans may question where this location is, so she just said Africa.

Banks (2000) states that from the issue of race have been questioned from the last fifty years in theoretical spheres mostly between theorists, sociologists and anthropologists. Two important questions been raised in these discussions are "in what way hair is an important thing in societies with a past of ethnic or cultural discrimination, and how they are used to intermediate the lasting marks of ethnic bequest" (p. 3). These types of subjects form our perception of the several truths black females drive through because of attractiveness and authority.³

Discussions on hair are straightly or tortuously related to prettiness and womankind. As Wolf (1991) perceives, the prettiness of culture assigns "worth to women in a straight up pyramid according to a socially forced

¹²Chimamanda Ngozi Adichie and Julia Romeu, *Americanah* (Sao Paulo: Companhia das Letras, 2014).

¹³Dominick La Capra, *Bounds of Race* (Cornell, 1990).

¹⁴Sarah Banet-Weiser, "Hair Matters: Beauty, Power, and Black Women's Consciousness. By Ingrid Banks. New York: New York University Press, 2000. Pp. x+210. \$55.00 (Cloth); \$17.50 (Paper).," *American Journal of Sociology* 106, no. 5 (2001): pp. 1442-1443, <https://doi.org/10.1086/320825>.

physical level” (p. 12).¹ She also says about beauty and power, in relation to women that it is an arrangement of authority in which possessions have been assumed by men, forcefully pushing females to participate for these equivalent possessions. In struggling for these possessions, women are anticipated to employ period sustaining a good-looking and attractive presence (p. 12). As a consequence, current feminist activist claim that appearance into the universality of supremacies that stamp femaleness on womanhood, in view of their obsession with bodily appearance as innate and optional. The novel depicts Ifemelu's search for identification in American society, an identity that she achieves after bearing and adapting to a long period of existence there. Her life in Nigeria is very different, and one may even say ordinary. She went to school, has a lovely family, and a boyfriend, yet she never feels like she stands out from the crowd. Her Blackness is centred and focused on when she immigrates to the United States, and she exposes the racism whites practise silently against Blacks through her blogging. In *Black Skin, White Masks*, Frantz Fanon also reveals the truth that dark people only become aware of their "blackness" in the context of a white world, as well as the plight of African-Americans in a society dominated by whites, as well as the culture of the coloniser, who eventually became victims of psychological, physical, and emotional problems. He cites events that demonstrate how even language is exploited to make black people feel inferior because of their culture. And how they are indoctrinated to believe that they are black first, then humanity. He opposes ideologies that state that one must face reality and react accordingly. Rather, he believes that in a racist society, one should figure out how it started and work to change it by demanding White people's independence, proclaiming liberation, and building a future free of the oppression of the past.

Except for tiny internal quarrels, the black man will not have to experience his existence for others as long as he stays on his home turf. [...]

Not only must the black man be black, but he must also be black in contrast to the white man.

The person who is white 89-90 (Fanon, 2008).²

That is also a reflection of how Americans identify Africans only on the basis of their external looks. Thus, identity is something that is both inside and outside. As in Ifemelu case she identifies herself happily as black in Nigeria but didn't always because when she immigrated to United States to attend University she becomes black there and she suddenly realized that she is something else called black.

Obinze felt the same way while working in a warehouse in London; once, when unloading, he leapt out of the truck and landed on his knee, limping back to the truck; the white driver in the front stated to another driver, "His knee is bad because he is a knee-grow," and they both laughed. This also demonstrates how, based on race, a civilization that claims to be superior to all others is responsible for the growth of racism.

When Dike was at school, he felt like he was a black person, and he told Ifemelu about it. His instructor had given everyone sunscreen cream, but when it was his turn, the instructor claimed he didn't need it. This demonstrates how, even in educational institutions, this form of discrimination is conducted invisibly.

As a result, an individual's identity is defined solely by one factor, and they feel as if their genuine identity has been lost.

“She was lighter and thinner; she fell into the role of Curt's Girlfriend.

Like if I were slipping into a favourite, flattering gown.” (Adichie, 241-242)³

Though Ifemelu feels that she is ‘a woman who is free from worries and cares but when her American boyfriend whose name is Curt introduces Ifemelu with his her his family and friends, she feels awkward and discovers herself in a state of prejudiced arrogances which made her feel that white are superior than them. Bell hooks exemplifies this idea of becoming conscious that one is a black woman who does not deserve a white guy when she refers to white womankind as the ones who have made it difficult for them to share mutual welfares and purposes as a whole cluster.

¹⁵Linda M. Perkins and Bell Hooks, “Ain't I a Woman: Black Women and Feminism.,” *Political Science Quarterly* 98, no. 1 (1983): p. 145, <https://doi.org/10.2307/2150228>.

¹⁶Fanon, Frantz. *Black Skin, White Masks*. New York: Grove Press, 2008. Print

¹⁷Chimamanda Ngozi Adichie, Elvira Lindo, and Milla Carlos Soler, *Americanah* (Barcelona: Penguin Random House Grupo Editorial, 2017).

“Historically, many black women saw white women as the white supremacist group that primarily wielded control over them, often in a more severe manner than racist white men” (hooks, 1982: 48).¹ She later ended her relationship with Curt and wonders if their same race is the source of their ongoing miscommunication and unease. And, as she previously stated, their relationship is immaculate; they have never had a disagreement as a pair. But the difference in skin colour between them tells her that they are both distinct from each other and that they cannot be one. No matter how much they love each other, the difference in colour will always exist between them and remind her of their differences. Edward Said in his book *Orientalism* examines how the people of the Orient, and by extension the people of the entire Asian continent, have been portrayed as inferior, barbarian, exotic, uncivilised, and so on. The Occident, or the people of the West, has created conventional images about the Orient. Orientalism is a cultural construct in which one culture views itself as superior to the other and hence dominates and suppresses it. The people of west (occident) dominate (orient). He says that Orientals are not like the way they seemed to be represented by the Occident, it is only a construction about them. He also argues in his book that those who have knowledge ultimately perceive power and they suppress those whom they considered inferior than them. Thus the occident shaped a world view as a result of which the East was recessive and less progressive than the west and thus could be directly linked to Edward Said's Orientalism, in which he claims that Europe and America are the founders of the "Orient." In this situation, Said admits that the knowledge Europeans and Americans have about Eastern peoples, i.e. the Orient – we will take Africa as an example – as an impression that can be discovered through a "partial lens," specifically, the knowledge we have about these nations through a "distorted lens," is undeniably inexact and filthy:

“One ought never to assume that the structure of Orientalism is nothing more than a structure of lies or of myths which, were the truth about them to be told, would simply blow away” (Said, 1978: 6). Thus, we say this then, that the culture of Africa is undeniably labelled and under control of the white man.²

In the novel, Adichie's protagonist, a blogger, serves as a glass through which the author attempts to explain her distinct perspective of American society. Racism is reflected throughout the narrative. Ifemelu was once discussing a magazine with Blaine (her black American friend with whom she is in a relationship) about how this magazine only gives make-up tips to people who have either fair or brown skin, but it deliberately ignored one segment of society, namely Black people, and he reacted as if it was a pointless thing to notice, so she decided to start her blog about it.

Thus, we can finally say that Ifemelu's relationship with Obinze brings the reader the opportunity to explore in depth the rapport within the African culture while at the same time it exposes the attitudes different groups have towards race with a mixture of ignorance, self-consciousness and fear. The author may believe that one is hesitant, and she proves her thesis through the figure of Auntie Uju. Auntie Uju is also an African, but when his kid inquired, "Are we black?" she replied, "Yes."³ and anytime she was in public with Dike, Ifemelu noticed her speaking with an American accent, demonstrating how even some Africans refuse to recognise their true selves and do what American society demands of them. Thus, racism is a real issue in America, and it is a genuine issue because it has actual ramifications in people's lives.

Another factor that plays a large role in every society is gender discrimination, which is linked to the enforced orthodoxy of language, which the protagonist felt at such a young age and she became aware of being a girl when she was in Nigeria, her hometown, and Sister Ibinado asked the girls to make fluffy garlands in honour of Chief Omenka, who has denoted two vans to the church. Auntie Uju, when she found out about the event, exclaimed, "What makes this girl such a thorn in the side? Since then, I've been arguing that she should be a boy if she's acting like this". This demonstrates how stereotypes are followed by society without regard for the implications they have on an adult child. Another example is when Obinze's mother was slapped in front of the pupils by a coworker, demonstrating how males dominate their authority and do not hesitate to use it even in public since society is not women-friendly and encourages men to do these things without hesitation.

Also when Ifemelu was struggling to search for a job in United States and when she was given the job of a "relaxer" by a man in USA. The author tried to show how even hopelessness make a woman do the things she would not want to. All these instances shows that it doesn't matter where one is but patriarchy and gender discrimination is everywhere even in societies display themselves as liberal.

¹⁸ Hooks, bell. 1981. *Ain't I a Woman: Black Women and Femenism*. London: Pluto Press

¹⁹ Edward W. Said, *Orientalism* (London: Penguin Books, 2019).

²⁰ Chimamanda Ngozi Adichie and Julia Romeu, *Americanah* (São Paulo: Companhia das Letras, 2014).

Americanization is one of the most wider theme in the novel .America the name in itself reveals it as a country full of hope ,having enough wealth ,having economic stability which is a dream of most of the immigrants but Adichie explores the theme of American Dream as it is only a myth about America for immigrants. Things are only better when seen from distant, the more one came closer the more one fall prey to discontentment and hard reality.

Adichie through the characters like Ifemelu,Aunty Uju and Obinze tried to show how the American dream is only a myth .Obinze when he was in London,United Kingdom he was considered as an illegal immigrant there and to become legal citizen, first he struggles to get a identity of someone else to have a job there, then to marry a girl by giving her the amount she wanted but at the end he caught by the police and deported back to Nigeria which shows that it's not the truth that whoever go abroad was definite about them that they may become rich ,this is only a myth as Ifemelu, the protagonist also thought the same but has go through a lot and struggles very much to get the identity.

Aunty Uju also in the beginning in United States did three jobs a day but still did not manage expense of her home and her only son Dike until she has passed United States Medical listening Examination. Ifemelu also in United States struggles a lot to get green card to do a job on his own name instead of using someone else identity.

Adichie tried to show that those who went abroad didn't became nova rich and American dream is only a myth only those who struggle hard for survival may become rich or one could say be able to pay their expenses . Thus, struggle for survival also became a major theme in this novel.Adichie shows how difficult it is to maintain relationships and how difficult it is to stand back and get oneself out of those emotions in her novel Americanah, and she does so through the character of Ifemelu.When she was in high school in Nigeria, she fell in love with Obinze and told Aunty Uju, who is more of a friend to Ifemelu, but when she immigrated to the United States, she noticed a change in Aunty Uju's behaviour, who told her son to call her Aunty Ifem instead of calling Ifemelu his sister, and she made her sleep on a mattress on the floor. From there, Ifemelu sensed how people change.Also there Ifemelu falls in love with Curt (white American) and Blaine (black American) but life challenges her at every step and she broke up with her second boyfriend Blaine and decided to came back to Nigeria, but now she is a famous blogger of race there and she had enough money even to settled there but she decided to came back and now she is in contact with Obinze and the memories of the past stuck her and she find it hard to get out of all this and once she said,"Love is a kind of grief" .¹

Americanah is Chimamanda Ngozi Adichie's third novel published in the year 2013 and this novel is basically an analysis of race in two continents United kingdom and United States of America. This is also a tale of childhood love at school of Ifemelu and Obinze and how their lives changed when they both immigrate to two different continents America and England. Through the life events of both these characters in Nigeria and in two different continents the authors tried to show how racism, identity crisis still prevails in societies which superiorize itself as liberal. Adichie herself is also from Nigeria and she too immigrates to USA and in this novel she wrote about her experiences which she felt as being black in America through the protagonist of the novel Ifemelu who was a blogger and used her as a device of her unsaid voice.

Ifemelu and Obinze when leave their homeland Nigeria they love each other . In America, Ifemelu struggle with what it meant to be black, despite her academic success. Obinze also plunges into a life which is dangerous and undocumented in London. But after a long time when they came back to Nigeria after fifteen years of separation they felt that they both still love each other no matter for how many years they remain depart even Obinze has been married then and has a daughter still he wanted to marry Ifemelu because Obinze relation with his wife is also smooth but he never felt comfortable and weigh down from things the way he felt with Ifemelu and in the final section of the novel Obinze spoke out his emotions to his wife about Ifemelu and married her.Thus, even after the abolition of slavery in the United States in the mid-nineteenth century, racism still exists there. While some constitutional amendments were passed to abolish slavery, offer citizenship, and the right to vote to blacks, colour prejudice continued to exist.Between 1873 and 1883 supreme court there made some laws of reconstruction and as blacks were considered as second class citizen by many and thus were separated by law from whites in both Northern and Southern states on the doctrine that is separated but equal andin 1896, the Supreme Court ruled that, despite their separation, they should be treated equally, that although they are separated but are treated equal.National Association for the advancement of colored People (NAACP) formed in 1909 which struggle for the direction of racial segregation and discrimination from American life .Till the

²¹ Chimamanda Ngozi Adichie and Julia Romeu, *Americanah* (São Paulo: Companhia das Letras, 2014).

middle of the twentieth century the focus of NAACP shift from private to public school segregation .In 1950 two major victories were won by them on “separate but equal doctrine” and on Plessy.¹

To summarise, some novels convey a fantastic storey in and of themselves, while others transform one's view on the world; *Americanah*, on the other hand, does both.

CONCLUSION

The world is currently undergoing an interminable crisis. It's racial discrimination. It has simply evolved over time from the traditional form which is whites versus coloureds to one cultural group versus another cultural group within the people of the same colour. In this study, the focus is on racial segregation and identity crisis in Chimamanda Adichie's *Americanah*. It is on record that blacks migrated from Africa to Europe in numbers during the slave trade era. It was a huge commercial venture which the white then thought as revolutionary. Its outcome over the years has proved that it was a huge calamity especially on the side of the blacks. After slavery ended and blacks were integrated into the wider American family, they were treated as second-class individuals in the foreign state, with inequality in all areas of life and society. In the history, significant efforts were made to remedy this mismatch, with whites enabling blacks to identify itself as humans in social structure. As previously stated, racial prejudice extends further than the classic whites vs blacks divide. It eventually transcends to culture versus culture. In United states, racism is divided into whites and blacks, however in Nigeria, race is divided into ethnic and ethnic group coloration. *Americanah* functions as a welcoming caesura in a dirge of immigrant abjection that is frequently rendered inaudible or incomprehensible by the constant popular demanding that. The is a tale that serves as a gentle reminder that racism is still very much alive and thriving. It's a book that explains the The American (and British) aspiration for a better life is unlivable. We are introduced to a number of situations in which the protagonist is subjected to discriminatory practices, comprising factors based on cultural origin, sexual orientation, region or ethnic minority, and economic status, from the very beginning of the work. As the writer has demonstrated, the importance of these various discriminatory layers is deeply harmful and unjust to Blacks as they are pulled to the bottom of society. Thus it can be seen the different problems that Adichie's characters face through her writing. As a result of the indissolubility of "race" and identity crisis concerns, this study demonstrates that these numerous hazards are a direct outcome of them.

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Covid-19 Management Using Disruptive Technology

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ABSTRACT

Several organizations, both public and commercial, have been pushed by the COVID-19 pandemic to undergo major change, reconsider critical components of their operations, and employ technology to assist operations while conforming to international health standards and recommendations. This had a significant influence on the commerce and governance of the general population as they went about their everyday lives, both for living and for carrying out their responsibilities. As a result of the unprecedented upheaval brought about by COVID-19, we as a species are being pushed to develop, adapt, and modify ourselves in order to survive. The development of Industry 4.0 is referred to as disruptive technology and has been dubbed as such. This technology has the potential to be used to a variety of aspects of our daily lives. For example, blockchain technology and data mining are both regarded to be disruptive technologies in their respective fields. COVID-19 governance insights are presented in this study, as is guidance for governments on how to implement technology that will lessen the consequences of COVID-19 outbreaks that are unprecedented.

Keywords: Machine learning, Technology, Covid-19 pandemic, Internet of medical things (iomt), Industry 4.0

INTRODUCTION

The idea that a lethal virus would be introduced to the globe after World War II would have been unthinkable at the time. But that is exactly what happened after the war. As of now [1, 6 million deaths have been recorded over the world]. Because these figures are official, it indicates that they come from countries that are extremely effective at adjusting to new technologies and reporting using the most precise methods currently available. During the earliest symptoms of COVID19, the information that was supplied was not of a reliable kind. This was mostly due to the fact that each participant had presented with asymptomatic and/or symptomatic symptoms of the virus at one point or another. In order to meet the urgent demand for data analysis and dissemination across many report reporting systems, both the government and responsible persons must work together to provide a comprehensive picture of the situation. Over 380 million people are believed to have been affected by the COVID-19 epidemic, according to government estimates. The virus is believed to have afflicted more than a billion people on our planet, according to unofficial reports. The COVID-19 has demonstrated to us how insignificant and vulnerable we are as a human race.

India has the largest population density of any country on earth. The medical facilities, as compared to the developed nations, do not have the infrastructure needed to serve the population properly. Approximately 25,778 hospital beds were available in 2017-2018, according to the National Hospital Facilities Survey [3]. As a result, the current infrastructure for dealing with public health has been subjected to an unanticipated amount of stress. To prevent the increase in the number of corona cases, a variety of measures have been implemented in accordance with health standards in advance. It was decided to build up several isolation wards and trace every passenger who was headed to India. Thermal screening was also done for every passenger. In addition to being placed in far more specialized wards with total isolation and surveillance for 14 days, travellers from source nations such as China and Italy [4] were also given significantly more attention. All public and private governing entities have taken a stance calling for a full closure of schools, restaurants, transit, colleges, malls, parks, houses of worship, and movie theatres, among other facilities. 82 districts in all 22 states and six union territories [5] were subjected to a complete lockdown as a part of a preventive strategy. The spread of the epidemic has been delayed to doubling every 6 days instead of 3 days as a result of the limits placed in place. Social separation of six feet has been imposed in accordance with health norms. In reality, the most severely affected cities are the metropolises of Mumbai, Delhi, Ahmedabad, Chennai, Hyderabad, Kolkatta, and Pune [6]. A large number of companies have been closed, and people's movements are restricted. A detrimental influence on national economies has resulted from numerous enterprises closing their doors permanently, resulting in an alarming rise in the number of unemployed individuals. Travel restrictions have had a substantial influence on the tourist and travel businesses, as well as on the governments and economies that rely on tourism and travel for their income streams. Some beneficial improvements have occurred as firms adjust to the "new status quo," despite the fact that the majority of the economic effects of managing COVID-19 are negative.

Small company owners should read this. It is critical for businesses to be familiar with their market and the clients that they want to serve with their innovative offering in order to be successful. Understanding the

complexity of their competitive environment is essential for businesses when it comes to knowing their market and the clients they want to serve with their innovative offering. Companies continue to struggle with identifying the distinctive value proposition of innovation and the differentiating traits of differentiation. In order to become and remain competitive, businesses must produce new, innovative goods and services while also modernizing their business methods. In order to determine how external factors, over which they may or may not have direct control, impact the value creation process of the technologies in issue, further research must be conducted. In order to better comprehend the manner in which these external institutional hurdles might prohibit businesses from bringing their innovative ideas to market, it is vital, on the one hand, to have a better grasp of the ways in which they can be overcome.

User information about their present position is provided by the geolocation business Foursquare, which has been extensively adopted and updated to provide users with this information. In order to present a comprehensive picture to the governing authorities, the development, management, and analysis of larger data sets on the developing network of infected people, patient information, their movements, clinical trials, pharmaceutical consumption, and public health data [7] will be required. An extra source of information might be anything from text messages to social media to cookies that have local connections with the community. Machine learning and artificial intelligence must be utilized as a triggering event for the local population since the amount of data is enormous. The applicability of face mask detection was investigated in a study done by NVIDIA [8]. Datasets of Medical Mask faces and Non-Medical Mask faces were used to train deep streams on the Jetson platform, and the results were analysed.

Aside from geolocation and face recognition, it is critical to recognize that the symptoms of cough and the frequency of cough have a strong association with one another and with one another. COVID-19. In this scenario, it is essential to identify the presence of cough and the frequency of coughing. Audio and visual cues can be used in conjunction with cough detection technology. We discovered that using virufy [9] to accelerate the fundamental implementation of cough detection was a significant improvement. At the door entrance, we have installed pixy cameras to check the profiles.

CASE STUDY

The execution of this Case Study in a private education institute in India, with the support of a private organization, has been approved by a private organization. In the event of a pandemic, specific departments at the institute were deemed obligatory attendance, and students were also expected to be in attendance. An important element in the idea for providing early data to the management as well as to local authorities has been the identification of COVID-19 at an early stage. A highly popular app that has gotten positive feedback from both the public and private sectors tracks the vicinity of a certain individual. Due to the fact that Apple and Google have both adopted this approach in their own operating systems in the United States, this application has gained widespread acceptance among users. The most significant disadvantage of this technique is that it does not offer a heatmap of the regions that have been affected. Despite the fact that this system includes government entities monitoring the heatmap, mapping an individual with high precision is still a drawback of the system. As a viable solution for the usage of customized applications, we have presented a feasible solution, and after many tries and mistakes, we have been able to successfully forecast at least COVID-19 and remove false positives with far better accuracy.

ARCHITECTURE

Client Side Registration:

Application demands that users register using their phone number and sign-in/register using either Google or Facebook SSO to ensure that their information is secure. Additionally, Bluetooth should be enabled at all times. Once the registration process is complete, a one-of-a-kind QR code is created. This QR code may be downloaded onto their individual mobile phones in either PDF or JPEG format, or in the mobile format. Local cookies are those that are saved on the mobile device. As a nutshell, the registration procedure on the client's end is quite straightforward. Below picture in Fig 1 shows the process simplicity in typical client-server application registration.

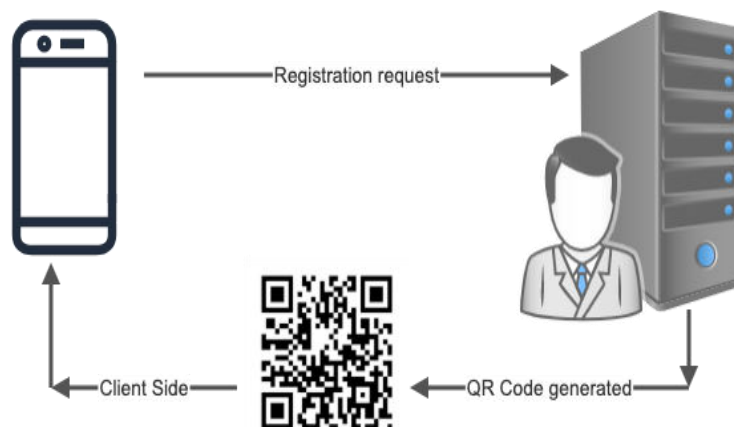


Fig 1. Client Registration process.

Institute Registration:

Since the institutions demand that tracking of the COVID-19 be enforced, the tracking equipment should be registered too. The supported systems are pixy camera, Raspberry pi, Manual QR Scanner. Each tracking equipment will have unique equipped ID. The following data model is used for registration of the institute.

```
{"institute_name": string,  
"physical_address": string,  
"equipment_type": string,  
"equipment_id": string,  
"date_of_registration" : date,  
"product_version" : string }
```

Mask Identification Training

Training of the mask identification comprises phases as follows

1. Training data on NVIDIA GPU by using data sets from
 - a. Kaggle with masks [11]
 - b. Fddb Dataset without masks[10]
2. We have to convert the the dataset to KITTI Format.
3. Convert the KITTI format to Tensorflow records particular file to train.
4. We do have pre-trained models in the Tensorflow to train the tensorflow records.
5. The model that was utilized was DETECTNET V2
6. We have utilized this approach to obtain inferior performance.
7. We next utilized Transfer learning tool kit 3.0 [12] to transfer all the training data we have achived using DETECTNET V2
8. We now to have test the model that we have trained.
9. Initial findings were not that satisfying relative to the mask detection.
10. We had to retrain the pruned model and when we re-tested again, we were able to acquire lower pth value (better accuracy)
11. We could then deploy the learned model and deployed it into Raspberry Pi using Tensorflow lite.
12. The accompanying Fig 2 is a reference showing our model functioned more similar and was able to recognize masks with great precision.



Fig 2: Mask detection

Cough Identification Training:

One of the most difficult issues is determining whether or not the cough is a legitimate COVID-19 symptom. This is never a simple task since, unlike the Mask detection system, which operates in real time and does not require user participation, this system relies on user participation by requiring users to record their cough and submit us an audio file for analysis. The fundamental assumption is that the user always gives accurate information on his or her own cough. In contrast to other types of data, audio files do carry asymptomatic information. Coughs will be performed with the same individual in numerous approaches in order to verify the system's functionality. In this situation, the detection of false positives is a disincentive, and the AI is not doing nearly as well as it should be doing its job.

Based on the training models of the virufy we were able to get higher accuracy in the detection of the COVID-19.

Entry and Exit Management with Pixy and Tinxy:

One of the main criteria was to manage the entrance and exit of an individual and make a complete touch less system that will allow both ingress and egress of any individual. Both Pixycam and Tinxy are different systems used for different purposes. Pixy is more often used for the object detection upon the trained models. The reason for using Pixycam is because it can track QR codes for different heights of projection up until 5 cms close with detection speed of 100 objects per second. This is very important in the consideration of the design since this can be used at the toll roads and also in liaison with Arduino. Usage of pixy Cam has given a lot of flexibility in detection of not just bar code / QR code but also along with embedded objects. We have used Arduino wifwebclient to connect to the webserver.

WORKING MODEL

This is one of its kind model in which, every individual in any given area is tracked and reported for the COVID-19 symptoms immediately and alert messages are sent to the concerned authorities.

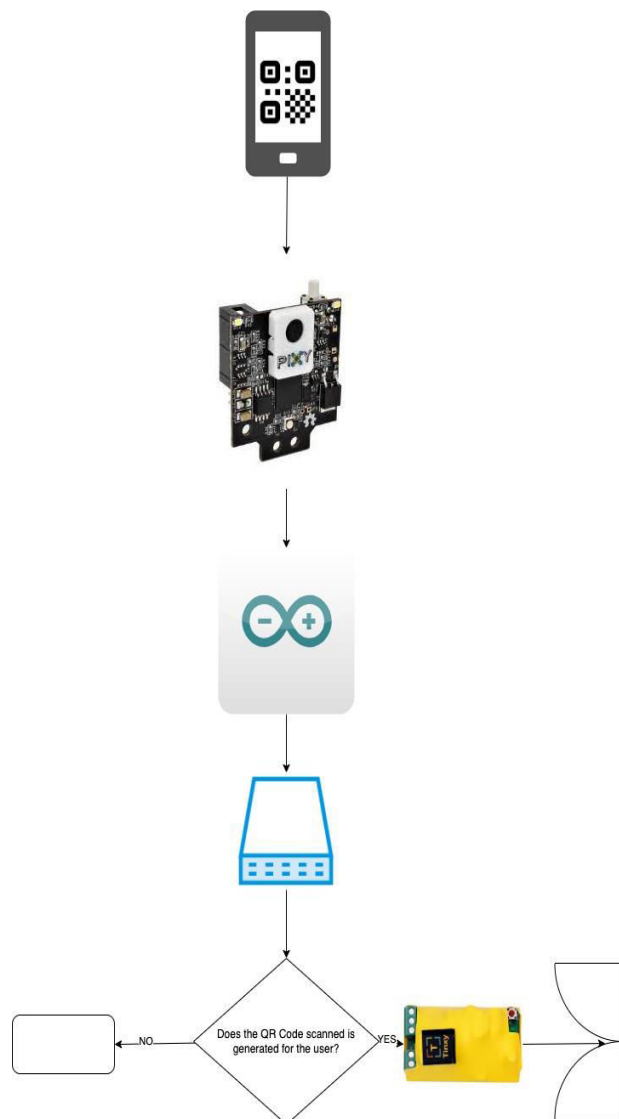


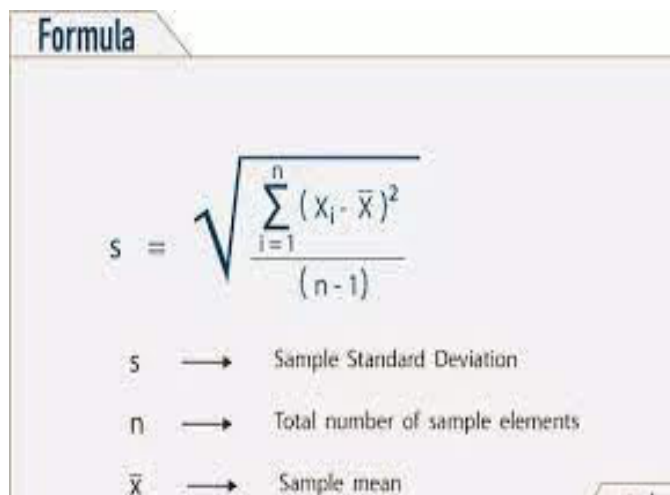
Fig 3: Entrance and exist system.

A Pixy is put at the entry and exit systems of each business unit, and it is connected to the Arduino system using an Ethernet cable. When the user presents the QR Code, the Pixy recognizes that it is a QR code and transmits the decoded value to the Arduino, which in turn sends a request to the backend API over the webservice. A verification is carried out by the API on the institute registration module by recognizing the device with its serial numbers and authenticating them. After the institute has been successfully authenticated, the call QR code is examined to ensure that it corresponds to the registered user. Once the authentication has been validated, the control is passed on to the tinxy module, which will then automatically open the doors for the user to go in through them. The timestamp associated with the user information is included in the data collection.

Upon entering, a facial mask detection system, which was previously proposed, scans the users to ensure that they are not wearing masks. A great deal of effort is taken to ensure that the user's privacy is not violated. The fact that the user is not wearing a mask is noted even though a face cannot be recognized by the system. When the data is compared to the entry timestamp, a message is sent to all of the cookies stored on the mobile device at the same time, alerting them to the violation of the health rules that have been broken. The information is recorded in a database so that it may be analyzed further by government agencies. It is possible for the user to capture his or her own coughing sound for later study when they cough. It is determined whether or not the cough is COVID-19 by using the trained model of cough categorization. It is necessary to store the user_ID together with the data for the purposes of analysis and governance. This guarantees that the user can be identified and tracked with relative ease.

ADAPTATION

This system was further adapted in malls, cinema theatres, schools, toll booths for COVID-19 control. Based on this system an estimated visitation virtual queue has been implemented.



The image shows a slide titled "Formula" with the following content:

$$s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{(n-1)}}$$

s → Sample Standard Deviation
n → Total number of sample elements
 \bar{x} → Sample mean

Fig 5. Standard Deviation

In order to estimate the number of visits, the standard deviation can be utilized as a starting point for computation. This formula may be used to calculate the age, gender, and sub-location of a person. According to the timestamps of the people that entered and exited the population, the mean wait time is determined. When a user requests a visitation slot, we may reserve a spot in the queue based on the formula above for a certain sub-location in the mall based on the user's request.

CONCLUSION

The overwhelming reaction in COVID-19 handling is a testimonial from numerous institutions in both the public and commercial sectors following the implementation of the system, which allowed for the identification of a specific individual. Local governing bodies have reaped significant benefits as a result of this approach. The time spent enquiring about probable contacts based on a person's memory recall has been reduced significantly as a result of this improvement. Local authorities were able to prioritize the treatment of cases based on factors such as age, gender, and location using this method. Private businesses that had previously suffered from a lack of business have adapted to this approach since the pre-checks for the COVID-19 health requirements are done in a professional manner. Individuals' prior reservations have, in fact, improved customer service and enhanced consumer satisfaction in the commercial business. This method efforts to generate, which was implemented using cutting-edge technology during COVID-19, has completely transformed government and commerce, transforming a calamity into a blessing.

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Biogenic Synthesis of Fe₃O₄ Magnetic Nanoparticles: A Reusable Catalyst for Benzimidazole Synthesis and its Microbial Studies

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ABSTRACT

The current study is an attempt to synthesize iron oxide nanoparticles in an environmentally friendly manner by employing agro-waste-derived HRSPLAE (Hibiscus Rosa Sinensis Plant Leaf Ash Extract in Water) (dry fallen) as a solvent medium for the synthesis of aryl-substituted benzimidazoles. Various spectroscopic and analytical approaches are used to characterize the generated iron oxide NPs. To explore the application of the prepared biogenic Fe₃O₄, we selected synthesis of Benzimidazole derivatives by o-phenylenediamine (OPD) and aromatic aldehyde accelerated microwave irradiation. Greener method employed, The FT-IR, LC-MS, ¹H-, and ¹³C-NMR methods are used to characterize the produced 2-aryl benzimidazole derivatives. The catalytic activity of the MNPs can be reused up to five times without any noticeable loss. Furthermore, the antibacterial activities of the selected benzimidazole derivatives are examined.

Keywords: Benzimidazole, o-Phenylenediamine, Agro-Waste, Reusable, Nanoparticles, anti-microbial.

1. INTRODUCTION

According to the definition, nanoparticle diameters range from 1-100 nm, though some of the examples of NPs have several hundreds of nanometre in size made up of organic or inorganic materials showed various novel properties compared to its bulk materials.[1] Among them, magnetic NPs emerged as a special property with high magnetic properties, small size, less toxic, and better microwave absorption compared to bulk materials.[2] The main applications of magnetic NPs in material research includes catalysis, [3] sensors, [4] magnetic recording media,[5] high density, [6] cancer treatment,[7] and reliable drug delivery in clinical studies[8]. Because iron oxide NPs operate extremely magnetically at narrow size distributions of less than 20nm, a major application of these nanostructure in medicine is reported [9]. The particle size played important role in physical and chemical properties of the materials. Among various metal oxide NPs reported, Fe₃O₄ NPs found unique and exploited various applications in material science, catalysts and biomedical field. Hence, the synthesis of these materials is important scope. The synthesis of Fe₃O₄ NPs using variety of synthetic procedures reported in the literature, including sonochemical [10], co-precipitation [11], hydrothermal [12], electrochemical [13], and micro-emulsion top-down method [14]. Material scientists have been recently investigated the green technique preparation of Fe₃O₄ NPs, which has been widely described.[15] The researchers were encouraged to investigate phytochemical aided synthesis from natural agro-waste extract or leaves, fruits, stems, or roots because this method is easy to use, low cost, and safety.[16] Nanotechnology has recently been extended to the catalysts world for the development of a robust and simple protocol for the synthesis of various bioactive compounds in both stepwise and multi-component reactions in a cost-effective, environmentally friendly, and recyclable [17-23]. Herein, we selected synthesis of benzimidazole derivatives using biogenic prepared iron oxide NPs, Benzimidazole is an isostere structure of naturally abundant nucleotides, and some of the familiar pharmacological drugs used are depicted in **Fig 1[24-29]**.

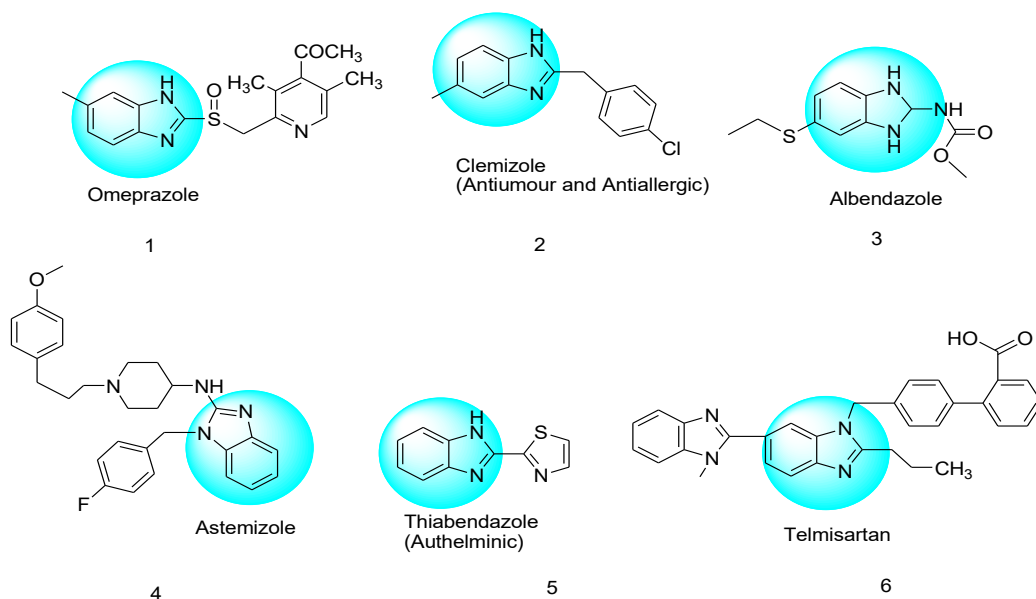


Fig 1: Biologically prominent selected 2-aryl benzimidazole derivatives.

The numerous structural variants of the benzimidazoles showed pharmacological application in anti-cancer [30-35], anti-fungal [36], anti-oxidants [37], anti-microbial [38], anti-inflammatory [39], anti-histamine [40]. In order to continue our research on green protocol synthesis using agro-waste generated solvent media, we first synthesized Fe_3O_4 NPs with HRSPLAE extract medium, and the resulted Fe_3O_4 NPs attempted to synthesize benzimidazole derivatives by reacting substituted aromatic aldehydes with OPD, and efficient for benzimidazole synthesis in ethanol accelerated by MWI. The best of our knowledge, no report published on HRSPLAE-mediated MNPs synthesis, and prepared MNPs used as a catalyst for the synthesis of benzimidazole derivatives.

2. Experimental

Sigma-Aldrich and sd-fine make purchased and used without additional purification. Microwave irradiation with a power range of 180-300 watts. Shimadzu UV-Vis spectrometer was used to record FT-IR spectra on KBr discs. TMS was used as an internal standard and ^1H - and ^{13}C -NMR spectra were obtained on a Bruker Spectrometer 400MHz. HRSPLAE elemental analysis was performed using an ESICO Microprocessor flame photometry 1382. The LC-MS spectra collected on a Xevo G2-MS QT mass spectrometry system. SEM pictures were taken using VEGA3, TESCAN (CZECH REPUBLIC) equipment, while EDX data was obtained using BRUKER nano, GmbH, D12489 (Germany) equipment with an accelerating voltage ranging from 0 to 30 kV. For the XRD investigation of HRSPLAE ash, Rigaku micro flex was used. The data was collected using $\text{Cu K}\alpha$ radiation in the reflection mode at 30 kV, 10 mA, $1^\circ/\text{min}$ scan speed, and a scan range of 10 to 90° . TLC was used to track the reaction's progress. The melting points were obtained in open capillaries and are uncorrected.

2.1. METHOD

2.2. Preparation of HRSPLAE

The leaves of the Hibiscus Rosa sinensis plant (dry fallen) were picked from the university area and dried in the shade light. Thermal treatment was used to turn the dried leaves into ash. 10 gm of Hibiscus Rosa Sinensis plant dry fallen leaves ash was suspended in 100 mL distilled water in a 250 mL beaker and magnetically stirred for 2 hours at room temperature, followed by filtration to obtain the pale-yellow extract known as HRSPLAE.

2.3 Synthesis of Biogenic Mnps

Ferric chloride was used as a precursor, and dry leaf extract was used as a reducing agent, to make magnetite (Fe_3O_4) nanoparticles. In an Erlenmeyer flask, a volume of 100 mL of 25 mM $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ precursor solution and 25 mM ferrous chloride solution were mixed at a 2:1 ratio, and an equivalent volume of extract was added. For a better response, the solution was stirred thoroughly for an hour at 200 rpm at room temperature, instantaneous precipitation was noticed after small amount of 1M ammonia solution added. After centrifuging the solution for 15 min at 7000 rpm, the pellet was suspended in water and centrifuged again under the same circumstances. To remove contaminants, the process was carried out three times. To eliminate moisture and undesirable particles, the pellet was put in a hot air oven at 90°C overnight. The dry nanoparticle powder collected and stored in an air tight container.

2.4. General Procedure for the Synthesis of Substituted Benzimidazole

In a 50mL round-bottomed flask, 20mg of Fe₃O₄@HRSPLAES NPs were added to a mixture of o-phenylenediamine (1 mmol) and benzaldehyde (1 mmol) in 3 mL of ethanol, and the mixture was subjected to microwave irradiation. The reaction is monitored by TLC with ethyl acetate: hexane (3:7) as the eluent. After the reaction, filtered and evaporated solvent under reduced pressure and recrystallized using ethyl acetate-hexane mixture gave product pure and not require further chromatographic purification. The final product is characterized by FT-IR, ¹H-, ¹³C-NMR, and mass spectrometry methods (Scheme 1).

3. RESULT AND DISCUSSION

To synthesize the NPs the agro-waste extract was used, for this Hibiscus Rosa Sinensis leaves (HRSPLAE-Hibiscus Rosa Sinensis Plant Leaf Ash extract in water) were collected from a nearby university campus. The whole process was demonstrated in the experimental section. The fundamental purpose of the green extract was used as a reducing agent and to make magnetite (Fe₃O₄) nanoparticles, to replace the current chemical process by offering biocompatibility and non-toxicity, as well as managing surface and size during the production of NPs.

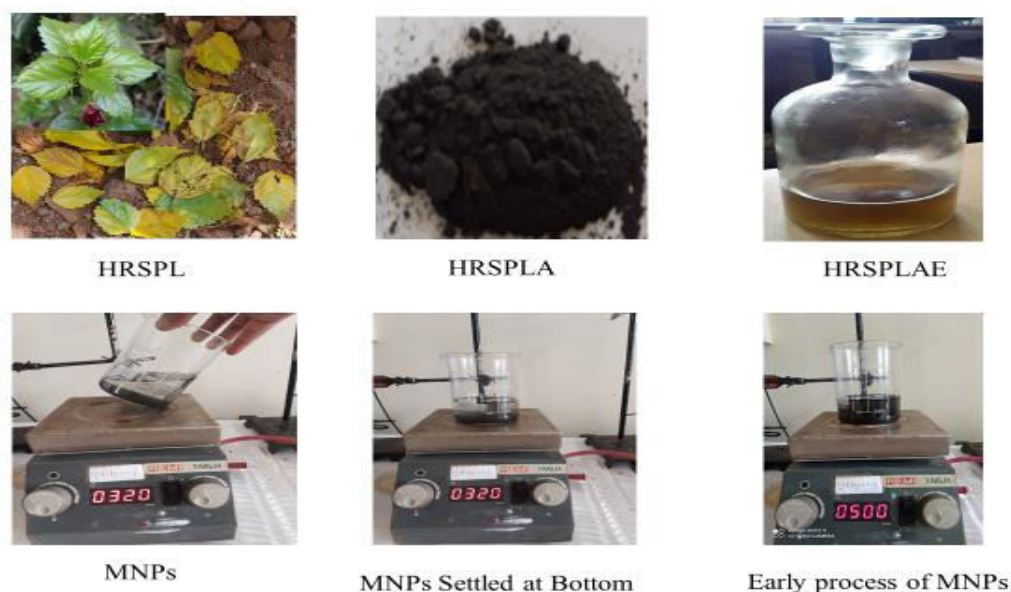


Fig 2: General representation of the synthesis of Fe₃O₄@HRSPLAE.

From the foregoing, it is clear that the preparation of our green new NPs, HRSPLAE aqueous medium is used to make iron oxide, magnetite (Fe₃O₄) nanoparticles. The reduction of metal salts to nanoparticles was validated in this work by the color shift of the precursor solution from red to black after adding the extraction solution (**Fig.2**). The magnetic properties of the particles are substantially influenced by the production processes utilized. Fe₃O₄ hematite is the oldest known iron oxide mineral and is widespread in rocks and soils. Maghemite, Fe₂O₄, is a red-brown ferromagnetic mineral having a cation deficient site that is isostructural with magnetite. The color was displayed by precipitated magnetite nanoparticles due to molecular excitation caused by surface plasmon resonance (SPR). Effective absorption occurs when the frequency of the electromagnetic field remains coherent with the electric motion. Fe₃O₄ has a characteristic absorption of wavelengths between 190 and 250 nm, the presence of functional moieties on the iron nanoparticles was detected using FT-IR. The sample was scanned between 4000 and 300 cm⁻¹. An absorption band at 3437.54 cm⁻¹ denoted a normal -OH stretch, C-H methylene asymmetrical stretch (> CH₂) had a short intense peak at 3047.31 cm⁻¹, while C-H methyl asymmetrical stretch (-CH₃) had a peak at 2923.27 cm⁻¹. The presence of the imino group was indicated by a high absorption peak at 1637.71cm⁻¹. The Peak 1384.08 cm⁻¹ attributed to sulfate moiety, the sulfate moiety is to blame. A strong peak at 1113.17 cm⁻¹ represented the -OH bend of phenol or tertiary alcohol. The OH group of primary or secondary alcohol was demonstrated by a prominent absorption peak at 1275.84 cm⁻¹. The C-O-CN stretch was shown at 1108.95 cm⁻¹ and the -C-O- of epoxy groups was shown at 823.53 cm⁻¹ and Spinel ferrite has a characteristic high-frequency band extending from 540 to 575 cm⁻¹. The morphological structure of the nanoparticles was determined by scanning electron microscopy (SEM-EDX) analysis indicated the nanometre-sized particle formation with spinel shape (cubic crystal system) Furthermore, the particles were homogenous, which could be attributed to particle aggregation. The XRD was used to characterize the phase

identification and crystalline structures of the prepared nanoparticles Using Debye and Scherrer's formula, the average crystallite size was found to be 6.19 nm and were obtained in the X-ray diffraction pattern, which were consistent with the standard structure of magnetite with Fe_3O_4 NPs face cubic center. The particles were both crystalline and amorphous in nature as shown by longer and more intense diffraction peaks. In particularly our Catalyst have been characterized with various instrumental methods as described (3.1 to 3.1.5).

3.1. Mnp's Characterization by Various Techniques

3.1.1. UV-Spectroscopic Analysis

On a Shimadzu, preliminary confirmation of the produced Fe_3O_4 nanoparticle was performed using UV-Vis Spectrophotometry. The highest absorbance of the sample was measured at wavelengths spanning from 200 to 800 nm. UV-Visible examination of the solution confirmed the formation of NPs, yielding strong peaks that were equivalent to those seen in the literature It was clear that all flavonoids, phenolics, and bio-drug candidates were used to make the Fe_3O_4 @HRSPLAE NPs. During the production of nanoparticles, the color of the solution changes, starting with red wine and advancing to Fe_3O_4 . After a large black-colored precipitate accumulated at the bottom of the beaker, nearly all of the aqueous layer was decanted, and NPs were extracted using a bar magnet, between 300 and 375 nm the highest absorbance peak occurs (Fig S3).

3.1.2. FT-IR Analysis For Fe_3O_4 @ HRSPLAE Nps

FTIR spectroscopy was used to explore the nature of surface adsorbents in nanoparticles. 0.5 mg of the substance was mixed with 150 mg of KBr in the method. The mixture was then pressed into discs and placed in the sample holder, where the spectrum was produced using an FTIR spectroscope that scanned the samples at wavelengths spanning from 8000 to 300 cm^{-1} . Aside from that, there appear to be more trace level metal oxides in the NPs catalyst, such as P_2O_4 , NaO, and Al_2O_3 , among others, which aids to play a crucial role in the catalytic activity. At this concentration, the presence of metal oxide indicates that the catalyst activity in our chosen reaction is more noticeable. Peaks at 562.68 cm^{-1} , showing the presence of a Fe-O vibrating system. Fe_3O_4 Nanoparticles are the catalyst, as evidenced by peaks at 3437.54 cm^{-1} . The type features of -OH stretching may be seen at 1637.71 cm^{-1} . It also exhibits K-O and Ca-O stretching, as well as the presence of carbonate (K_2CO_3) at the 1384 cm^{-1} peak (Fig S4)

3.1.3. Sem Analysis

Scanning electron microscopy was used to analyze the morphology of produced iron oxide nanoparticles. The sample was thinly coated onto carbon tape and left to cure for 5 minutes. SEM photos were taken at a magnification of 30000X. The accelerating voltage on the SEM machine was set to 20 kV. The sample was kept at a low voltage to prevent it from being destroyed. An EDX attached to the SEM equipment was used to check for the presence of elemental iron, as shown in the image (Fig.5).

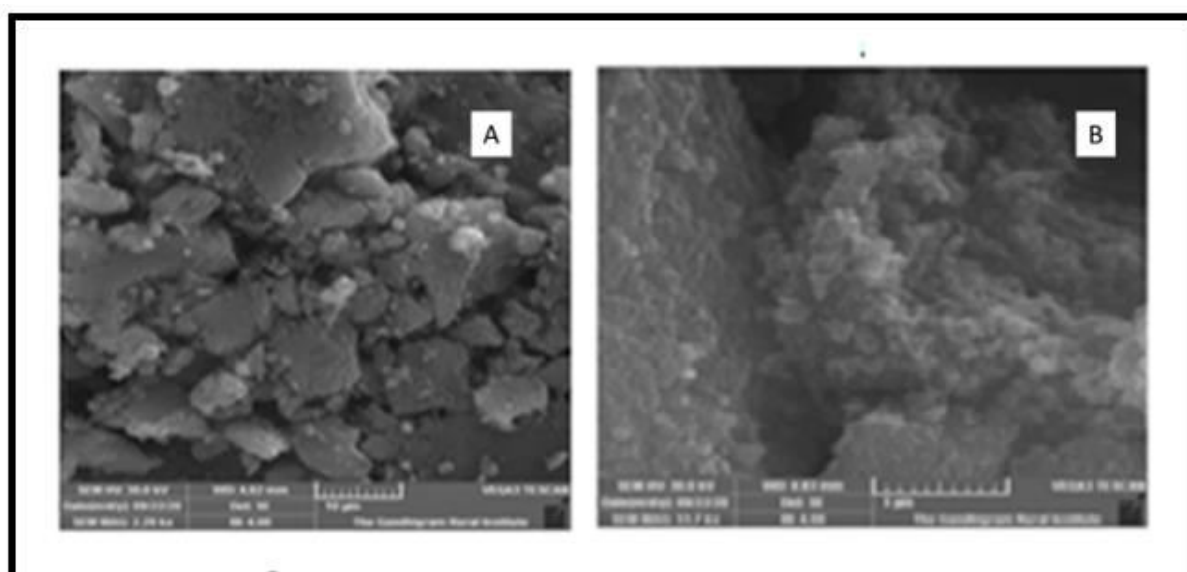


Fig 5: SEM-image of HRSPLAE@ Fe_3O_4 nanoparticles.

3.1.4 EDX Analysis

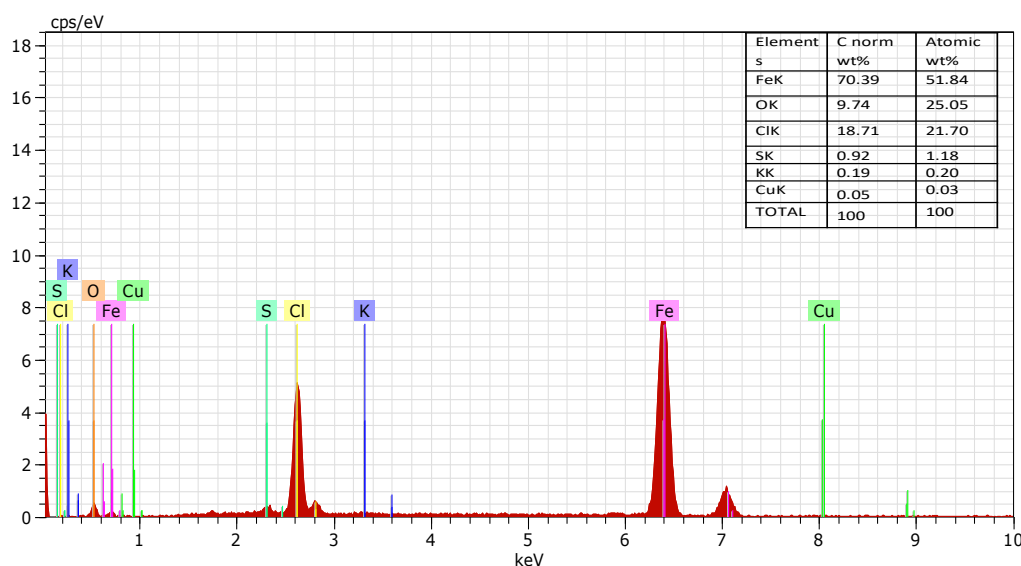
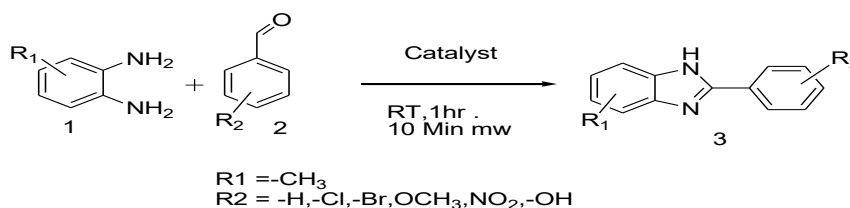


Fig 6: EDX analysis of HRSPLAE@Fe₃O₄ nanoparticles.

The elemental properties in the synthesized Green NPs are revealed by EDX spectroscopy. These properties indicate that intense peaks such as Fe, S, Cu and K, are exist, among these, we found that Fe is a major percentage. The results of the EDX analysis are shown (Fig.6). The discovery resulted in the composition of mixed oxides. Fe is present 70.39 percent of the time (C. norm weight percent). and S, Cu, K so on in trace level. The NPs nanoparticles have been proven. The emergence of the Cl signal in this study is owing to the presence of a precursor and green extract HRSPLAE in water, as described.

3.1.5. X-Ray Diffraction Study

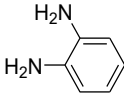
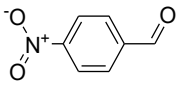
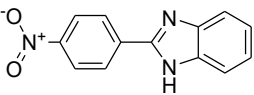
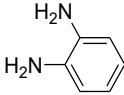
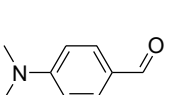
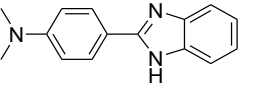
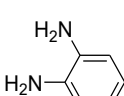
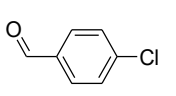
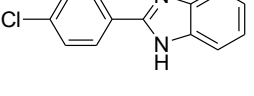
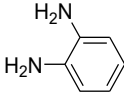
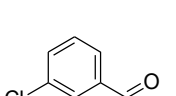
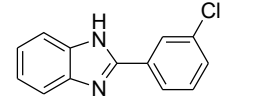
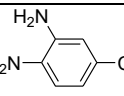
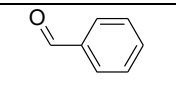
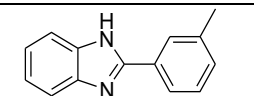
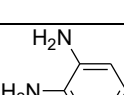
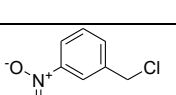
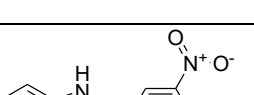
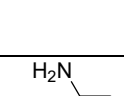
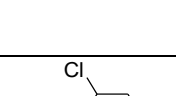
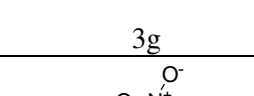
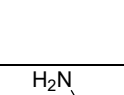
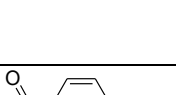
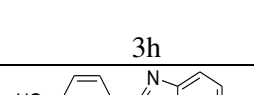
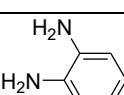
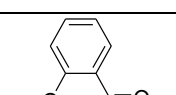
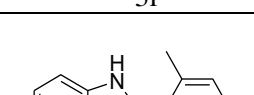
The crystalline size of the nanoparticle was determined using an X-ray diffractometer (Rikagu) The size was calculated from the spectrum using Debye–Scherrer’s equation. $D = (K_{\lambda}) \div (_Cos_{\theta})$ where D is the particle size of the nanoparticle, K is the shape factor, λ is the wavelength, θ is the Bragg’s angle and β is the line width (full width at half maximum) in radius. X-ray diffraction (XRD) of Fe₃O₄@HRSPLAE NPs was compared, and the peaks 2 θ values were found to be 30.110, 33.700, 42.500, and 55.25. These peaks matched the inverse spinel cubic structure of NPs Catalyst well, and in addition, the peaks at 37.90 and 65.45 for K₂O and K₂CO₃ and 39.55, 49.60 for Al₂O and Al₂CO₃ suggest the presence of Al₂O₃ (FigS7).



Scheme 1. Synthesis of 2-phenyl-1H-benzo[d]imidazole.

Table 1: Some Selected Drug Scaffolds And Physical Properties.

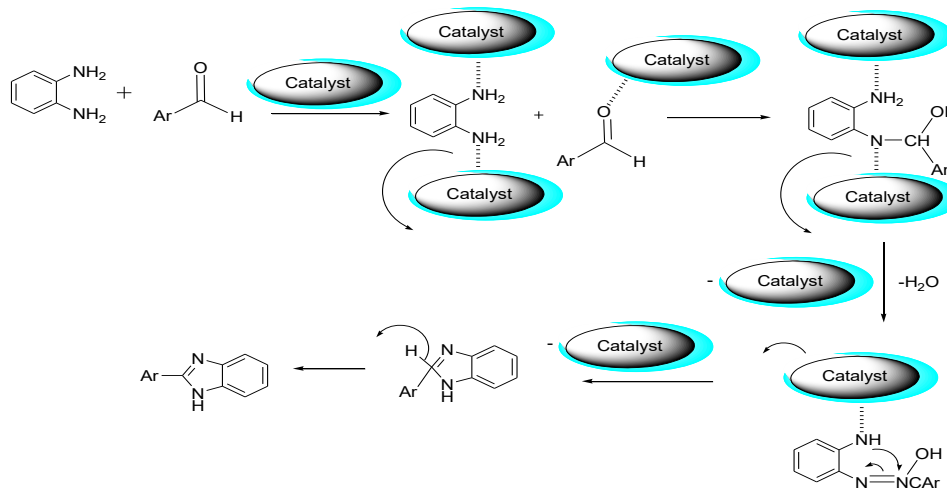
Sl No	Diamine	Reactant	Product	Time	Yield	Melting point	
						Obs.	Lit.
1				40	90	321-324	322-323

2				45	89	235-237	238
4				5	86	237-240	238
5				5	88	205-207	206-208
6				40	85	134-141	139-141
7				45	89	203-205	204-206
8				45	86	263-265	264-265
				45	87	231-232	234
11				40	89	177-179	179-180
10				45	85	258-261	264-265

Almost all of the reactants were scaled down to 1 (mmol). 1 (mmol) aldehyde, 1 (mmol) orthophenylene diamine, and in mg catalyst FT-IR and LCMS, ¹H-NMR, and ¹³C-NMR were used to describe the products in comparison to literature m.p ⁰C. **Isolated yields.

3.1.6. Plausible Mechanism

Scheme 2 depicts the likely sequence of events for the Green NPs-catalysed synthesis of 2-substituted benzimidazoles from o-phenylenediamine and benzaldehyde. In the beginning, Fe₃O₄@HRSPLAE sites were used. The carbonyl group of benzaldehyde is responsible for its electrophilic activation. promotes the attack of nucleophilic o-phenylenediamine on the amino group, resulting in the creation of the intermediate, which loses one water molecule and undergoes transformation oxidation in the presence of air to yield the desired outcome. We summarised several results for the formation of similar reactions in order to highlight the advantages of biogenic catalyst over alternative catalysts. (**Table 1**).



Scheme 2: General plausible mechanism for the formation of Benzimidazole derivatives.

Table 2: Optimization of Catalyst with different amounts.

Entry	Amount of catalyst(mg)	Time (min)	Yield %
1	00	10	Trace
2	30	5	82
3	40	5	95
4	50	5	98
5	60	5	98

To optimise the catalyst, the desired amount of catalyst required to execute the reaction in very outstanding yield. As a result of the catalyst optimization, the yield at 50 mg (**Table 2, entry 4**) is very good and no further reaction progress has been detected in reactions catalysed at microwave and room temperature.

Table 3: Optimization of reaction using different solvents.

Entry	Solvents	Solvents(ml)	conditions	Yield (%)
1	EtOH	3	MW	98
2	EtOH	3	rt	80
3	H ₂ O	3	MW	65
4	CH ₃ CN	3	rt	88
6	CH ₂ Cl ₂	3	MW	68
7	MeOH	3	MW	90

we concluded that the minimal catalytic media required for the present work is 3 mL for 1 mmol scale reaction; EtOH was used as a suitable solvent throughout the work.

Table 4: Comparative study of various Catalysts with present one.

Entry	Catalyst	Solvent	Temperature Conditions	Time	Yield (%)
1	SnCl ₂ /Nano SiO ₂	EtOH	reflux	40min	94
2	Silica bonded N-propyl SO ₃ H	EtOH	reflux	3-4hrs	95
4	Fe ₃ O ₄ @PVA-SO ₃ H	EtOH	reflux	10min	99
5	SnCl ₂	EtOH	reflux	10hrs	80
7	Fe₃O₄@ HRSPLAE	Aqueous/ EtOH	Mw Stir	5 min 1hr	98 95

We optimised the catalyst and conditions as shown and we concluded that, under various conditions, among this our catalyst is found more efficient, we employed a unique catalytic method to make substituted benzimidazole derivatives in this investigation. To avoid using more dangerous chemicals in the synthetic process we applied a greener method, The compounds were described and supplied in 3a, 3d, and 3c. (Fig S9-S23).

3.2. Antimicrobial Activity

As illustrated in the images, we can examine the biological activities and conclude that the MIC findings imply extraordinarily good inhibition growth. U (3c compound), F(NPs), and N (3d compound) were employed to distinguish the material's activity against E. coli, staphylococcus, (Anti-bacterial) and candida (Anti-fungal). The role of U has been recognized in three organisms: E. coli, Staphylococcus, and Candida, but there is a limited inhibitory zone in both E. coli and Staphylococcus. The involvement of N is detected in three organisms: E. coli, Staphylococcus, and Candida; however, F is more effective in Candida and E. coli, but not so much in Staphylococcus (Fig S24). we found the best results from MIC rather than Disc diffusion methods (Table 6).

3.2.1. Procedure for MIC Test

To confirm the antibacterial activity of our isolated product, we ran MIC testing. To accomplish so, we followed the standard technique, which included using a total of 9 tubes for dilution and administering each drug with BHI for MIC. Twenty millilitres of drug candidates were added to 380 millilitres of BHI broth for each tube's dilution, and 200 millilitres of BHI broth were divided among the next nine tubes. The first tube, which contained 200ml of BHI broth, received 20ml of the starting tube. This was referred to as 1/10th dilution, and 200ml was passed from the first tube to the second tube to achieve 2/10th dilution. The serial dilution was recycled up to three times for each medication theme. The necessary organism was collected from stock feed culture, 5ml was taken to mix with 2ml of BHI broth, and 200ml of the aforesaid culture suspension was supplied to each sequence's diluted tubes. From the MIC dilution tubes, the first 3 or 5 tubes were plated (which is sensitive in MIC) and incubated for 24 hours, then the colony count was obtained the next day. MBC is used to determine if the extract (Dry) has a bacteriostatic or bactericidal effect on the organism. If there is no bacterial growth due to the bactericidal effect, but there is bacterial growth due to the bacteriostatic effect, the bacteriostatic effect will be affected.

3.2.2. MIC Results

Table.6: Anti-Microbial And Anti-Fungal Study.

Sl. No.	Samples	100 µg/ml	50 µg/ml	25 µg/ml	12.5 µg/ml	6.25 µg/ml	3.12 µg/ml	1.6 µg/ml	0.8 µg/ml	0.4 µg/ml	0.2 µg/ml
	Staph aureus										
01	U	S	S	S	S	S	S	S	S	S	R
02	F	S	S	S	S	S	S	S	S	S	S
03	N	S	S	S	S	S	S	S	S	S	R
	E. coli										
01	U	S	S	R	R	R	R	R	R	R	R
02	F	R	R	R	R	R	R	R	R	R	R
03	N	S	R	R	R	R	R	R	R	R	R
	Candida										
01	U	S	S	S	S	S	S	S	R	R	R
02	F	S	S	S	R	R	R	R	R	R	R
03	N	S	S	S	S	S	S	R	R	R	R

Note: U=3c Compound, F=Iron MNPs, N=3d Compound. R=Resistance, S=Sensitive.

3.2.3. Test for Catalyst Recyclability

The recyclability of Green NPs catalyst was assessed for the optimum synthesis of 2-phenyl-1H benzo[d]imidazole (3a) molecule. The same catalyst was used for the repeated cycles throughout synthesis at the optimal condition. Surprisingly, the green MNPs catalyst may be recycled and reused at least five times before substantial catalytic activity or output is lost (Fig.25).

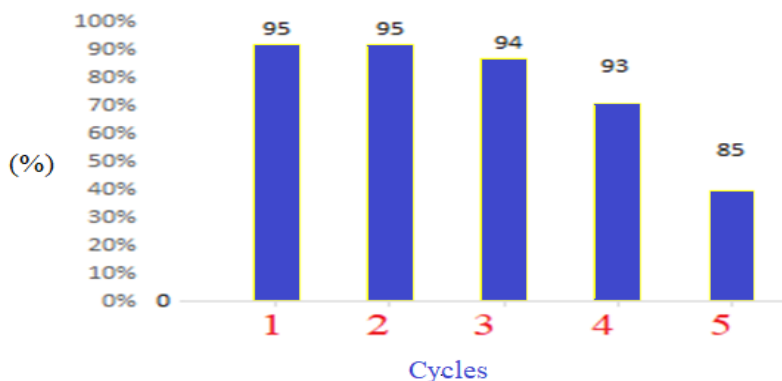


Fig 25: Graphical representation of recyclability of catalyst $\text{Fe}_3\text{O}_4@ \text{HRSPLAE}$

4. CONCLUSION

In a greener procedure, $\text{Fe}_3\text{O}_4@ \text{HRSPLAE}$ is a fantastic eco-friendly catalyst that is more effective, easily separable, and plays an important part in organic transformation. Furthermore, we can recycle this NPs catalyst up to the fourth cycle without a significant workup, the products were isolated in pure, no column separation was required, and the reappearance of NPs was studied using a bar magnet. The entire set of NPs was located, Compounds 3c and 3d had excellent inhibitory zones in MIC findings, and they were also tested with NPs, yielding excellent yields. Experiments in biology found that the MIC achieved good outcomes in biological trials, according to the findings and achieved outstanding findings utilising the MIC technique.

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Access to Data This study's findings are backed up by the following data upon reasonable request, available from the corresponding author

Declarations

Humans and Animals in Research Statement

None

Informed Consent

Not applicable

Potential Conflict of Interest

There are no competing interests declared by the authors. Author Contribution.

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A Study of Comparative Analysis of Ancient Education System and Medieval Education System of India

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ABSTRACT

This research paper presents a comparison between ancient education system and Medieval Education system. This basic highlights the structure of ancient education which contributed to the assimilation of moral, social and civic value by quality manpower society. Muslim invaders repeatedly invaded and as a result Islam became firmly entrenched in India. Political instability due to repeated invasion and aggression adversely affected the existing education system. The quantity of education is greatly affected the quality of manpower for social benefits.

Keywords: Ancient education, Muslim education, assimilation, aggressive

INTRODUCTION

The ancient education system has unique features and qualities that are not found in the ancient education system of any other country in the world. Gurukul (Ashram) was a type of school in India, residential in nature, where students lived close to the teacher (guru). In a gurukula, students will live equally, regardless of their social status, learn from the guru and distribute work among themselves to help the guru in his daily life. At the end of the study, the student will be ready to pay Gurudakshina (one time fee) to the Guru. Gurudakshina is a traditional gesture of recognition, respect and gratitude. Sanskrit was the language of the Vedic education system and Pali was the language of the Buddhist education system. In the Vedic period, Vedas, Bedanga, Upanishad philosophy, Puranas and Trakshashastra, and in the Buddhist period, three Pitakas were the subject of study. Even in the Vedic age, women were trained in music, dance, housework and art. At that time vocational education was also free. Learning methods. The duration of the study and the type of teachers were unique in ancient India.

An outstanding feature of ancient of life philosophy in India is that although there is no great significance attached to physical existence on earth, the importance of action in this inert world is not neglected. The doctrine of Karma (Karma) occupies a very important place in the Indian way of life and education. Action or work should not be for the liberation of mankind. This is the ideal of the education system of ancient India as well as the doctrine of action. Therefore, the ultimate object of one's devotion is Brahman, not this world. The material world is the lab of the human soul where one has to take systematic education for one's own development. The ancient Aryan culture of India placed maximum emphasis on simple living and high thinking as the moral basis of education for self-development. As a result, the individual is essentially invited to acquire knowledge both materially and spiritually.

The main components of the formation of od and perception through hearing or intellect. This education system can be pervaded by heavenly grace. The ancient Indian sal in the same way the philosophy of life was shot by bringing salvation along with the physical development filled by the consciousness. The purpose of education in ancient India The purpose of education is as follows:

1. Education in ancient India was a matter of personal concern. It primarily focuses on student personality development.
2. Education is identified as a process, which leads to one's inner progress and self-satisfaction.
3. Teachers have applied strategies, methods and approaches that students will easily understand.
4. It was believed that a person's progress refers primarily to the training of his or her mind as a means of acquiring knowledge. This knowledge will enhance his creative ability.
5. The principle of thought was inferred more than the subject of thought. So the primary subject of education was the mind. Fundamentals of Ancient Indian Education Fundamentals of Ancient Indian Education are stated as follows: Knowledge of Life In ancient India, students primarily devoted themselves to their teachers.
6. The medium of Instruction was Sanskrit.

Our India is one of the most ancient civilizations in the world. Long before the arrival of Aryans in this country, India was a civilized country, had its own culture and education. Indian thought is divided into Brahmanical teachings and Buddhist teachings. The main goal of the spiritualist Brahmanical teaching was "liberation", which is the ultimate attainment of self-knowledge, self-realization and personality. And the ideal was eternal liberation from this inanimate life and world.

An important feature of the Brahmanical education system was the father-son relationship between the guru and the disciple. It is rare in the history of education to have a guru like India. One of the main elements of Tapoban education was its environment. These learning centres were located in the centre of cosmic nature in the forest away from the locality.

Brahmanical education system, Upanayan is an essential event for initiating students in student life. Upanayan literally means 'to take to them'. And the age of their admission was 6 years for Brahmin children, 11 years for Kshatriya children and 12 years for Vaishya children respectively. Monitoring system was prevalent in the ancient education system. The responsibility of teaching young children was given to the upper class students. The lives of teachers and students were tied to well-regulated duties. There was no problem of discipline in ancient education. Begging was compulsory. Eating more than three times a day and night was forbidden. Only Brahmins, Kshatriyas and Vaishyas got the opportunity to get education. However, there was no caste system in the Buddhist education system.

In the early days of Brahmanical education system, women had a very high position in the society. Even if not, later the place of women was very high, they were called nuns. All sections of people were allowed to get admission. In ancient times, the influence of mass education was first seen mainly in Buddhism. In the Brahmanical system of education there was Upanayan for starting, where prabrajya was in the Buddhist system of education. The long 12-year non-residential education of the Buddhist monastery life ended with the Upasampada ceremony. Shramana had to attend the meeting of the monks during Upasampada language was given importance in the field of education in modern Indian education as in modern times. Especially in Buddhist education arrangements were made for imparting mass education through mother tongue (Pali). In the field of ancient Indian education, only Buddhism has an international perspective on education.

In ancient India, education was not open to the public. Education was only for the rulers, priests and the privileged. Shudras at the lowest level of the four castes and women of all castes were not given access to education. The Shudras were the largest part of the population in ancient India. Mantra chanting was forbidden for all of them. Vedic reading was a major aspect of education in ancient India.

There are various differences of opinion regarding the subject of education in ancient India. Just as education was not universal in this period, so too the institutional form of the education system could not be noticed for a long time. It is known from Mahabharata that education started after Upanayan.

Through Upanayan ceremony, through which the student would come in contact with vows, restraint, rules, guru and deity. During the Brahmacharya, the costume of the student was to live in the lower part, Ajin in the upper part, the shaved head, the dress of the Brahmachari with the rod. Penalty means the necessary support for a long journey in education. Apart from this there was Yajnopavita or Paita. At the Upanayan ceremony, the young student would light a fire and with his name and birth certificate, he would apply to the Guru for discipleship. Students had to take an oath to remain devoted to their education. The meaning of what the guru used to say to the disciple on this occasion is as follows: the heart of the disciple should be connected with his heart, the heart of the disciple should follow the guru and the guru should have the unwavering opinion of the disciple.

In Muslim education system the curriculum will be on the study of Quran, Hadith, Arabic grammar, logic, language etc. There were separate teachers for different subjects. In addition to religious education, special emphasis was placed on secular education. Among the religious teachings were Quran, Islamic law, history of Islam etc. Secular education included the study of Arabic literature, grammar, history, philosophy, geography, astrology, etc. . The main features of early Muslim education:

1. Primary education was imparted through "maktabs" which were attached to or separate from the mosque.
2. Most of the maktabs were either patrons or benefactors of the rulers.
3. Although the syllabus varied from place to place, learning the alphabet and reciting the Qur'an was compulsory.
4. Arabic and Persian were required in high government positions.

5. There were several village schools where students had to pay for their education, not cash but kindness.
6. The teaching profession was considered a dignified one and teachers were highly respected.
7. Technical and vocational education is encouraged by the rulers.
8. Education was considered as a tool to achieve happiness in the world and to acquire knowledge of Allah.
9. The teacher showed boundless love and affection towards the students and the students respected their teachers.
10. Lots of secular subjects like astronomy, agriculture, trade, medicine were included in the syllabus.

Ordinary women were not entitled to education. Only woman belonging to royal family could receive education. The Hindu education system existed in parallel with the Muslim education system in the Middle Ages. Its existence in the Middle Ages cannot be ignored. In Bengal, Vedic religion and Vedic education spread among the upper classes during the Sena period. Among the general population, Jainism and Buddhism were the most influential. But with the advent of Muslims, Indian education began to take on a different dimension. The curriculum of Muslim educational institutions included grammar, rhetoric, logic, theology, metaphysics, literature, astronomy, mathematics, medicine and theology. The predominance of rational sciences can be seen in the curriculum towards the end of Mughal period. The language teaching method created by Emperor Akbar is also noteworthy.

He thinks that the method of learning to read and write is acceptable instead of the Persian method of learning to write after learning to read. Time division was also announced. For example, two days for learning letters with pronunciation, one week for sorting letters. Then learn to read short prose and verse with religious and moral education by adding letters and at the end learn to read by yourself. Akbar announced four daily programs learning the alphabet, arranging letters, reading new and repeating old texts. Bengal was not outside the Muslim rule. Before the arrival of Muslims, the education system of Bengal was mainly confined to Brahmins. The Muslim rulers allowed the lower caste Hindus to benefit from the privileged Hindu class. As a result, the path of intellectual development of the lower class Hindus was opened. The tax-free land donated by the Muslim rulers for the patronage of education was not only for the Muslim educational institutions, but also for the Hindu educational institutions.

Free land was donated by the government for madrasas and tolls, not for primary education or pathshala. Schooling was completely self-sufficient. Although the Muslim rulers did not allocate any free land for schooling, it never became an obstacle for the lower classes to get education. Manik Chandra Rajar Gan, a book of poetry written by a Hindu poet, states that during the Muslim rule, the lower castes of Hindu society, Hari and Saud, were well educated enough to read and write documents. Even barbers and sweepers gained fame in science and literature.

Although madrasa education was introduced in Bengal during the Sultanate period, it was generally confined to the Muslim rulers. However, the Muslim rulers never opposed the practice or teaching of Bengali language. On the contrary, many sultans have encouraged the study of Bengali language and literature. In medieval Bengali literature, the name of Hussain Shah has been repeatedly mentioned. Shrikar Nandi writes, 'King Hussain Shah is the husband of Kshitij. Basumati will be punished by Samadan. It is not uncommon for Bengali language and literature to flourish during the Sultanate period. Naturally, the Shudras on the ground floor are the bearers of these two streams. Everyone else was with. Pastor William Adam's report shows that out of 639 teachers in 729 schools in 13 police stations in Burdwan, 359 were Kayas .

The rest are 108 Brahmins, 50 Sadegapas, 30 Aguris, 13 Vaishnavas, 10 Teli, nine Bhatta, six Gandhabanikas, six Kaivartas, two Bagdis; And Nag, Tanti, Daivajna, Vaidya, Yugi, Barui, Kamar, Moira, Dhopa, Rajput and Kalu do one. Nine Muslims and three Christians. Of the total 414 teachers found in Birbhum, 354 were Brahmins, Kayasthas and Sadegapas. One was a Muslim teacher and four were Christians. Out of 285 teachers in South Bihar, only 26 were Kayasthas. In Murshidabad, out of 6 teachers, 39 were in Kayastha.

The ancient education system has influenced other systems of education not only in India but also in other parts of the world. The main feature of this education system was that teachers and students worked in coordination with each other. Teachers treated students like their own children and students respected their teachers and obeyed their orders. Students engage in household chores in addition to academic education and thus develop their skills and abilities. Muslim rulers had completely different cultures, different philosophies, different religions and different languages. Different cultures, religions, philosophies, etc., have undergone major changes. It also affected education at various levels.

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Psychosocial Stress among Indian and Foreign Diplomats: A Comparative Study

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ABSTRACT

A number of diplomatic personnel are posted under national auspices in India. Diplomats are generally well trained and prepared psychologically to face stressful situations. However, the high scale negotiations and decisions affecting their nation create an uncertain and stress provoking environment. The present study aimed at investigating psychosocial stress in a small exploratory sample of 50 Indian Foreign Services officers in the Ministry of External Affairs and 50 Foreign Diplomats posted in India. The Psychosocial Stress Scale designed by Srivastava (1992), "Indian Council of Medical Research (ICMR)" New Delhi, was used to assess the psychosocial stress (strained interpersonal relationships, excessive responsibilities, financial constraints, marriage related stress, health related problems, adverse situations and perceived threat) amongst a sample of IFS officers and foreign diplomats. t-test was applied to know the significance of difference between the foreign diplomats and IFS officers. The findings revealed that the foreign diplomats had significantly higher psychosocial stress due to Strained Interpersonal Relationships, Excessive Responsibilities, Financial Constraints, Marriage Related Stress, Health Related Problems and Adverse Situations as compared to their Indian counterparts. However, there was no significant difference on perceived threat between the two groups of foreign services officers.

Keywords: Strained Interpersonal Relationships, Excessive Responsibilities, Financial Constraints, Marriage Related Stress, Health Related Problems, Adverse Situations, IFS Officers, Foreign Diplomats posted in India

INTRODUCTION

Today stress affects almost everyone in one way or the other, emerging as a key concern, with no one remaining unaffected. Stress is perceived as a dynamic state involving uncertainty about something important to the individual (Schuler, 1982). Stress which was considered to be life threatening in earlier ages, has now been accepted as a normal part of life. This acceptance has come due to experiencing the positive effects of stress, widely called as 'Eustress' (Fevre, Kolt and Matheny, 2006) which serves as a motivating factor for achievements. But when the stress level increases unmanageably it turns into 'Distress' which depletes the energy core of the person and pushes him towards a variety of psychological disturbances. Prolonged exposure to such stressful situations leads to the depletion and exhaustion of resources in the mind and body, posing a huge threat to a person's mental and physical health. No profession can be said to have remained untouched by it. This fast paced world, complexities of modern life, globalization, advancement in social media, increase of job pressure, polluted environment and food, etc all pose a challenge to our mental peace, resources, privacy, health and lifestyle. The American Psychological Association (APA) which conducted its 12th annual survey in August 2018 found that on a scale of 1 to 10 the average reported stress level was 4.9. In a survey, carried out by Cigna TTK Health Insurance (2018), it was found that about 89 per cent of India's population was suffering from stress compared to the global average of 86 per cent, with millennials suffering more than other groups.

A major cause of stress is psychosocial stress. Psychosocial stress is the result of our cognitive appraisal of what various situations demand. It discerns that we do not have the resources to meet the demand. Psychosocial stressors can include anything that translates into a perceived threat to our social status, social esteem, respect, acceptance within a group; threat to our self-worth; or a threat on which we feel we have no control over. Interpersonal relationships, excessive responsibilities, financial issues, health concerns, marital problems, adverse situations and perceived threat have been referred to as psychosocial stressors by Indian Council of Medical Research (1992). Psychosocial stressors influence our mood, sense of well being, behavior and health (Scheiderman, Ironson and Scott, 2005). All these psychosocial stressors trigger stress responses in our body.

American Psychological Association (2015) undertook a survey in USA where it was revealed that work and money (64 per cent) were at the top of the list as a source of significant stress, excessive family responsibilities were the third most common psychosocial stressor (54 per cent), followed by personal health concerns (51 per cent), health problems affecting family (50 per cent) and the financial constraints (50 per cent). Adults are more likely to find that excessive responsibilities with regard to family are more stressful than they have in the past.

Research findings have also indicated that as the stature and service profile rises stress also rises. One cadre of such prestigious and distinguished services are the diplomats of every nation. A diplomat is a person appointed

by a state to conduct diplomacy with one or more states or international organizations. Diplomats, therefore should have excellent interpersonal skills, be adaptable and resilient, have maturity in attitude and the ability to accept responsibility and challenge early in their careers. Their job profile includes representation and protection of the interests of the state, initiation and facilitation of strategic agreements, treaties and conventions; promotion of information, trade and commerce, technology, friendly relations and fostering peaceful relations between states. All these responsibilities build up and ultimately cause stress among diplomats. Occupational and social support were negatively correlated with stress and work-life conflict among Foreign Service Diplomats (Bellinger, Wiernik and Fliege 2018). Hibberd and Greenberg (2011) observed that due to the work in conflict zones, diplomats are at a risk of exposure to intense psychological stressors such as perceived threat and post-traumatic stress which affect their mental and physical health.

Globalization, advances in information and communication technologies (ICT), increasing role of international organizations and the rise of multilateral diplomacy are changing the physiognomy of diplomacy. Globalization and high competition among organizations increases the job stress, which affects the workers physical and mental health (Salleh, Abu and Keong, 2008). Longer deployments among diplomats were associated with poorer mental health including post traumatic stress disorder, depression and alcohol problems (Dunn, Williams, Kemp, Patel and Greenberg, 2015).

OBJECTIVE

The main objectives of the present investigation was to measure and compare psychosocial stressors among Foreign Diplomats posted in various embassies in India and Indian Foreign Service officers working in the Ministry of External Affairs, New Delhi.

METHOD

DESIGN

t test was applied to see the significance of difference between the Foreign Diplomats posted in India and Indian Foreign Service officers on the seven sub variables of psychological stressors (strained interpersonal relationship, excessive responsibilities, financial constraints, marriage related stress, health related problems, adverse situations and perceived threats)

SAMPLE

Purposive random sampling was employed to select a total sample of 100 Foreign Diplomats posted in India and Indian Foreign Service officers. The data was collected from Indian Foreign Service officers posted in the Ministry of External Affairs, New Delhi and from Foreign Diplomats posted in India in various embassies located in New Delhi. Their participation was voluntary. A total of 50 Foreign Diplomats posted in India and 50 Indian Foreign Service officers posted in the Ministry of External affairs answered the questionnaire. The age range was between 30-50 yrs.

TOOLS USED

Psychosocial Stress Scale (Srivastava, 1992) was used to collect data from the Foreign Diplomats posted in India and Indian Foreign Service officers regarding psychosocial stressors.

RESULTS

T-test was computed in order to find out the significance of difference between the mean scores obtained by Foreign Diplomats posted in India and Indian Foreign Service Officers on the seven sub variables of psychosocial stressors (strained interpersonal relationships, excessive responsibilities, financial constraints, marriage related stress, health related problems, adverse situations and perceived threats). The results of are depicted in Table 1 and graphically depicted in Figure 1.

Table 1: Showing the Mean, Standard Deviation and t-ratio of Foreign Diplomats posted in India and Indian Foreign Service Officers on the seven sub variables of Psychosocial Stressors

S. No.	Psychosocial stressors	Foreign Foreign Diplomats posted in India		Indian Foreign Service Officers		t-ratio
		Mean	SD	Mean	SD	
1.	Strained interpersonal relationship	5.38	2.602	2.66	1.825	6.051**
2.	Excessive responsibilities	6.32	3.120	3.52	2.565	4.902**
3.	Financial constraints	8.52	4.032	4.28	3.423	5.669**

4.	Marriage related stress	3.74	2.302	1.52	1.328	5.907**
5.	Health related problems	4.18	3.199	1.52	1.015	5.605**
6.	Adverse situations	10.02	5.101	5.44	2.991	5.477**
7.	Perceived threats	3.66	2.512	2.46	2.261	2.511

**p<.01 and *p<.05

Table 1 clearly indicates that Foreign Diplomats posted in India (M = 5.38) have scored (t = 6.051, p<.01) significantly higher on strained interpersonal relationships as compared to Indian Foreign Service Officers (M = 2.66). Similarly, Foreign Diplomats posted in India (M = 6.32) have scored (t = 4.902, p<.01) significantly higher on excessive responsibilities as compared to Indian Foreign Service Officers (M = 3.52). Table 5.1 also reveals Foreign Diplomats posted in India (M = 8.52) have scored (t = 5.669, p<.01) significantly higher on financial constraints as compared to Indian Foreign Service Officers (M = 4.28). Foreign Diplomats posted in India (M = 3.74) have also scored (t = 5.907, p<.01) significantly higher on marriage related stress as compared to Indian Foreign Service Officers (M = 1.52). Furthermore, Foreign Diplomats posted in India (M = 4.18) have scored (t = 5.605, p<.01) significantly higher on health related problems, as compared to Indian Foreign Service Officers (M = 1.52). Significantly higher scores on adverse situations (t = 5.477, p<.01) were secured by Foreign Diplomats posted in India (M = 10.02) as compared to Indian Foreign Service Officers (M = 5.44).

Although Foreign Diplomats posted in India have scored higher on all the seven sub variables of psychosocial stressors as compared to Indian Foreign Service Officers, but only six sub variables of psychosocial stressors (strained interpersonal relationships, excessive responsibilities, financial constraints, marriage related stress, health related problems and adverse situations) reached the level of significance. This reveals that Foreign Diplomats posted in India experience higher level of psychosocial stress as compared to Indian Foreign Service Officers.

DISCUSSION

A very important finding of the present investigation was that significant difference emerged in terms of psychosocial stressors between Foreign Diplomats posted in India and Indian Foreign Service officers.

There was a significant difference between Foreign Diplomats posted in India and Indian Foreign Service officers in terms of strained interpersonal relationship. Diplomats, posted outside their country, often face difficulty in communicating with others (The Telegraph, 2015). This can be due to the language barrier, cultural differences, different societal norms, etc. This unfamiliarity in turn breeds stress. Another, reason can be that as they are so far away from their own home, they are not able to diffuse the tension by venting out their emotions and sharing their thoughts and stress with their loved ones. Social support positively affects the stress and uncertainty associated with new situations (Kraimer, Wayne and Jaworski, 2006). The huge geographical barrier that accompanies any foreign posting somewhere brings with itself a feeling of loneliness. Moving to another country means leaving behind your extended family and close friends, all those people you could call up when you need any kind of help or support or a shoulder to cry on (Virtual Vienna, 2015). Though people are cordial with each other within the diplomatic circle, but there is always a fine line that cannot be crossed. The irony of this situation is that though diplomats are highly active socially yet at the same time they lack intimate social support. As a result, the network which can act as a valuable pressure release valve is often missing.

The results of the present study also indicated that there was a significant difference between Foreign Diplomats posted in India and Indian Foreign Service officers in terms of excessive responsibility.

When posted in a different country, responsibilities can feel like a never ending baggage. The “universalisation” of the international community, the growing numbers of international organizations, the emergence of new international factors such as non-governmental organisations, religious movements and multinationals, the development of communication methods, the growing role of public opinion, and the increasing risks to peace and security arising from global terrorism, are some of the variables influencing and shaping diplomacy today (Farnesina, 2014). The pressure of handling these situations with utmost care, dignity, charm and in a politically beneficial manner often takes a toll on diplomats. Being the representatives of their country, they need to manage interpersonal relations between the host country and their own nation diligently and intelligently (Farnesina, 2014). The baggage of all these elements keeps diplomats on tenterhooks. Another reason can be the excessive travelling that accompanies a diplomat. Due to various missions, meetings of various organizations and many other reasons, diplomats need to travel a lot which unfortunately adds to the responsibility. The lack of effective social support from others due to being so far away from their homeland,

family and friends, may lead to the building up of this pressure of excessive responsibilities. Even with the household help that is given to the diplomats, the language and cultural barrier proves to be an additional responsibility. The high level of various pressures becomes excessive and unmanageable, leading to stress.

Another significant difference between Foreign Diplomats posted in India and Indian Foreign Service officers was in terms of financial constraints. Though diplomats get a handsome salary, but the strain of maintaining two houses, one in the home country and one in host country, leads to financial constraints. Moreover, they also need to maintain a certain social obligation. Their standard of living and the social decorum is so high that it incurs an additional expense. Anxiety level about their future finances is also high in diplomats (The Telegraph, 2015). With all the travelling and different postings in various countries their expenses also increase. Spending money on the education of their children, maintaining their social status, dual homes, etc, all lead to stress.

Foreign Diplomats posted in India and Indian Foreign Service officers differed significantly in terms of marriage related stress. Distances rock every marriage. This is a problem that is a crucial stressor in the lives of a diplomat. Handling your holidays, bringing up your children, physical separation, communication problems, and many more are part and parcel of long distance marriages. The enforced distance and absence becomes a source of strain in their marital relationship. Another problem faced by diplomats is that of a 'trailing spouse'. When you move with your partner to a new country, the move means sacrificing your career, and all the sense of identity, purpose and social position that you had in your home country (Virtual Vienna, 2015). This can put a great strain on both the partners, and impact the ultimate success of their marriage. Moreover, excessive responsibility keeps a diplomat away from the house and more or less busy round the clock. Thus, the personal lives of the partners are jeopardized.

Furthermore, another significant finding of the present investigation was that Foreign Diplomats posted in India showed a significant difference from Indian Foreign Service officers in terms of health related stress.

The pressure to succeed at diplomatic assignments can become too stressful. Balancing life and work can be stressful at the best of times, especially for those whose work requires them to move abroad or spend prolonged periods away from family and loved ones. While undertaking a diplomatic assignment can be a hugely rewarding experience, the strain of uprooting an entire family, or moving away and leaving them behind can result not only in a sense of personal disappointment but also significant stress for the person involved (Politico, 2018). Lack of social support, feelings of isolation and loneliness, a change in environment, customs and weather, worrying about things back home, and the need to adjust to a different culture - it's easy to see how expats can develop psychological issues, such as stress, anxiety and depression. Depression, anxiety, bipolar disorder, psychoses, dementia, post-partum disorder and eating disorders are some examples of health disorder caused due to stress (Human Resources Director, Australia, 2017). The increased threat of terror across the world and the stress resulting from that threat alone can be a contributory factor when it comes to mental health issues (Politico, 2018). Excessive stress can interfere with a diplomat's productivity and performance, make an impact on physical and emotional health, and affect relationships. At the more severe end of the scale, work-related stress has been associated with increased rates of heart attack, hypertension, and burnout (Politico, 2018).

Another noteworthy finding of the study was that there was a significant difference between Foreign Diplomats posted in India and Indian Foreign Service officers in terms of adverse situations. Factors influencing adaptation to different cultures include many aspects of the host country (e.g. language, politics, climate, political stability), culture (attitudes, values, status of women), facilities (housing, transport, schooling, sanitation) and job factors (level of responsibility, attitude of colleagues, work schedule). Moving abroad means you'll also have to wrestle with different social security requirements, health systems, utility companies, banks, insurers, local government bureaucracies, tax regimes and a host of other activities that constitute daily life (Virtual Vienna, 2015). And if you have to do it all in a foreign language as well then the process becomes that much more complicated. These adversities combined together lead to severe stress. When posted in a foreign country, diplomats come across various anti-state elements. Although, they are given various diplomatic immunities and protection, they are still soft targets for these elements. Specially, when posted in a high conflict zone (e.g. Syria) the embassies and diplomats are often at the very top on the hit list of these anti-state elements. Moreover, with the growing terrorism in the world, there is always a fear of being an unfortunate victim of it at the back of your head (Farnesina, 2014). Another adverse situation that a diplomat faces is that of being an outsider in the host nation. Though the diplomatic community is undoubtedly friendly and warm and welcoming, the locals often treat you like an alien. This leads to the feeling of being lonely and unwanted.

Nevertheless an interesting finding that has emerged in the study was that there was no significant difference between Foreign Diplomats posted in India and Indian Foreign Service officers in terms of perceived threat. Although Foreign Diplomats posted in India have outscored Indian Foreign Service officers in terms of perceived threat, but the difference between the two groups has failed to reach the level of significance.

The training that diplomats undergo is so powerful and deeply ingrained inside them, that they find solutions to majority of the problems without perceiving the situation as a threatening one. Moreover, India is an overall peaceful and welcoming nation, the foreign diplomats posted here feel relatively relaxed as India does not come under a high conflict zone.

CONCLUSION

Thus, overall it can be concluded that Foreign Diplomats posted in India had significantly more stress due to psychosocial stressors as compared to Indian Foreign Service Officers.

These findings bring us face to face with the grave reality of the amount of stress faced by one of the most important and elite class in the entire world. As the world is becoming a smaller unit with each passing day, it is but obvious that all of us need each other and would do well to have friendly relations among ourselves. Or in other words we can say that no nation can survive alone. In such circumstances, good diplomatic relations are imperative. Here, the diplomatic community takes centre stage. It, thus, becomes the duty of the state to keep the diplomats in a stress free and effectively positive and welcoming environment. Not only the state but also every citizen should try to make foreign diplomats feel at home and less alienated. Fostering good diplomatic relations will not only help improve India's relations with the world but will also contribute to healthier trade relations, good economic diplomacy and in propagating peace and friendliness worldwide.

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Coping Behavior among Foreign Diplomats and Indian Foreign Service Officers: A Comparative Study

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ABSTRACT

A number of diplomatic personnel are posted under national auspices in India. Diplomats are generally well trained and prepared psychologically to face stressful situations. However, the high scale negotiations and decisions affecting their nation create an uncertain and stress provoking environment. These facts have serious implications on the psycho-social coping of diplomatic personnel. The purpose of this paper was to investigate the coping strategies in a small exploratory sample of Indian Foreign Services officers in the Ministry of External Affairs and Foreign Diplomats posted in India. In order to measure the coping strategies (problem focused coping, emotion focused coping and avoidance coping) Cope Inventory (Carver, Scheier, and Weintraub, 1989) was distributed amongst the sample of 50 IFS officers and 50 foreign diplomats. t-test was used to see the significance of difference between the foreign diplomats and IFS officers. The findings revealed that the foreign diplomats had significantly higher emotion focused coping and avoidance coping as compared to their Indian counterparts. However, there was no significant difference on problem focused coping between the two groups of foreign services officers.

INTRODUCTION

In today's fast spinning technical world stress has become a part and parcel of people's lives. Almost everyone, irrespective of their age, gender, socioeconomic status and ethnic group, experiences stress. All of us, at some point in our lives feel that we are on the edge of being overwhelmed by a negative event. Sometimes people feel so overwhelmed that they just give up.

In a survey, carried out by Cigna TTK Health Insurance (2018), a joint venture between US-based Cigna Corp. and Indian conglomerate TTK Group, it was found that about 89 per cent of India's population was suffering from stress compared to the global average of 86 per cent. In addition, one in eight people had serious trouble in dealing with stress, with millennials suffering more than other groups. Moreover, 75 per cent of respondents in India do not feel comfortable talking to a medical professional about their stress.

Everyone responds differently to stress depending on personality, cultural background, social circumstances, past experiences, stage of life, support networks and the situation we find ourselves in. One person may find a particular situation stressful, but, another person may consider it normal or even fun e.g. flying in a plane may be terrifying for one person and pleasurable for someone else. Thus, each one of us has a different stress trigger which may be small but lead to a huge amount of stress.

With every situation, one needs to develop effective coping strategies in order to cope with it and protect one's well being. Some basic forms of coping are problem focused coping, emotion focused coping and avoidance coping (Carver, Scheier and Weintraub, 1989). Active coping, planning, suppression of competing activities, restraint coping, seeking social support, etc are some forms of problem focused coping. Humour, focus on venting of emotions, religious coping, acceptance, denial, use of emotional social support, positive reinterpretation and growth, etc are some types of emotion focused coping. Mental disengagement, behaviour disengagement, substance use, etc are some major types of avoidance coping.

It has also been seen that as the stature and service profile rises stress also rises. Individuals who are a part of this cream of the society are forced not only to deal with stress but also to find various methods to deal with it. One cadre of such a prestigious and distinguished service are the diplomats of every nation.

Diplomats have generally been considered to be members of an exclusive and prestigious profession. A diplomat is a person appointed by a state to conduct diplomacy with one or more states or international organizations. Diplomats, therefore, should have excellent interpersonal skills, be mature in attitude and able to accept responsibility and challenge early in their careers. They should also be adaptable and resilient. Though international law grants diplomats extensive privileges and immunities, which further distinguishes the diplomat from the status of an ordinary citizen yet it also leads to a great deal of stress.

The Indian Foreign Service is the administrative diplomatic civil service of the Government of India. The service is entrusted to conduct diplomacy and manage foreign relations of India.

Their job profile entails representation and protection of the interests of the state, initiation and facilitation of strategic agreements, treaties and conventions; promotion of information, trade and commerce, technology, friendly relations and fostering peaceful relations between states. Diplomats may work at any of the embassies and consulates across the globe. A number of these postings are in demanding or even dangerous locales. They also face times of extreme hostility, which pose a threat to personal safety. In some cases, the host country is friendly but there is a perceived threat due to internal dissidents.

The international society is getting increasingly interdependent due to globalization, eroding the central role of the state. Diplomats are representatives of their states across the globe. This puts them under immense pressure. With economic globalization, the rate and effects of cultural shock and stress in expatriates and their families also increase.

Advances in information and communication technologies (ICT) are radically changing the speed of information and the way we relate (Diplomat Magazine, 2013). There is a constant competition between diplomats and the print and social media. This adds to the pressure on the diplomats as they have to both convey the right information to the host country and also have to keep confidential information from home country's media.

The agendas of foreign policy are exposed to social demands because people nowadays are better informed and more aware of the goings on in this globalized world. Therefore, diplomats have to be more flexible and constantly in contact with their Parliaments (Diplomat Magazine, 2013).

Another aspect is the increasing role of international organizations and the rise of multilateral diplomacy which is changing the physiognomy of diplomacy. Nowadays, no state alone is capable of responding effectively to current transnational challenges, such as climate change, epidemics or security. A diplomat must have a solid background and be a generalist, but at the same time he needs to specialize in national and international relations. The complexity of the diplomat's task has vastly increased which is clearly reflected when he has to defend his national interest while participating in formulating the opinion of an international organization (Diplomat Magazine, 2013).

To diffuse this state of pressure and excessive load, social support is needed. As diplomats are away from their home country, and many a times away from their spouses as well, so this support is also lacking, adding to a diplomat's already stressful life.

Thus, a variety of stressful situation surround the diplomatic life. Therefore, it would be meaningful to study how these diplomats cope with these stressors. The present investigation is a comparative study between Foreign Diplomats posted in various embassies in India and Indian Foreign Service officers working in the Ministry of External Affairs, New Delhi.

OBJECTIVE

The main objectives of the present investigation were:

- a) To measure and compare coping behavior among Foreign Diplomats posted in various embassies in India and Indian Foreign Service officers working in the Ministry of External Affairs, New Delhi.

METHODOLOGY

DESIGN

t test was applied to see the significance of difference between the Foreign Diplomats posted in India and Indian Foreign Service officers on the three sub variables of coping behaviour (problem focused, emotion focused and avoidant coping)

SAMPLE

Purposive random sampling was employed to select a total sample of 100 Foreign Diplomats posted in India and Indian Foreign Service officers. The data was collected from Indian Foreign Service officers posted in the Ministry of External Affairs, New Delhi and from Foreign Diplomats posted in India in various embassies located in New Delhi. Their participation was voluntary. A total of 50 Foreign Diplomats posted in India and 50 Indian Foreign Service officers posted in the Ministry of External affairs answered the questionnaire. The age range was between 30-50 yrs.

TOOLS

Cope Inventory (Carver, Scheier and Weintraub,1989) was used to collect data from the Foreign Diplomats posted in India and Indian Foreign Service officers regarding coping behavior:

RESULT

T-test was computed in order to find out the significance of difference between the mean scores obtained by Foreign Diplomats posted in India and Indian Foreign Service Officers on the three sub variables of coping behaviour (problem focused coping, emotion focused coping and avoidance coping). The results of the table are depicted in Table 1

Table 1: Showing the Mean, Standard Deviation and t-ratio of Foreign Foreign Diplomats posted in India and Indian Foreign Service Officers on the three sub variables of Coping Behaviour

S. No.	Coping Behaviour	Foreign Foreign Diplomats posted in India		Indian Foreign Service Officers		t-ratio
		Mean	SD	Mean	SD	
1.	Problem focused coping	50.92	7.480	49.34	7.136	1.999
2.	Emotion focused coping	64.30	6.780	52.28	11.477	6.376**
3.	Avoidance coping	23.98	5.531	17.84	3.235	6.776**

**p<.01 and *p<.05

Table 1 clearly indicates that Foreign Diplomats posted in India (M = 64.30) have scored (t = 6.376, p<.01) significantly higher on emotion focused coping as compared to Indian Foreign Service Officers (M = 52.28). Likewise, Foreign Diplomats posted in India (M = 23.98) have scored (t = 6.776, p<.01) significantly higher on avoidance coping as compared to Indian Foreign Service Officers (M = 17.84).

Thus, it is evident from the results that Foreign Diplomats posted in India use emotion focused coping and avoidance coping significantly more as compared to Indian Foreign Service Officers. Foreign Diplomats posted in India have scored higher on all the three sub variables of coping behaviour as compared to Indian Foreign Service Officers, but only two sub variables of coping behaviour (focused and avoidance coping) reached the level of significance. However, all the three coping mechanisms were employed by both Foreign Diplomats posted in India and Indian Foreign Service Officers.

DISCUSSION

A very important finding of the present investigation is that significant difference emerged in terms of coping behaviour between Foreign Diplomats posted in India and Indian Foreign Service officers. The results clearly indicate that though Foreign Diplomats posted in India and Indian Foreign Service officers did not differ significantly in terms of problem focused coping, Foreign Diplomats posted in India have scored significantly higher in terms of emotion focused coping and avoidance coping.

Diplomats when posted in foreign countries are faced with a variety of adverse situations and face a lot of stress. Some research suggests that emotion-focused coping is more effective in dealing with terror events since such occurrences are unpredictable, uncontrollable, and produce chronic stress (Weiss and Cropanzano, 1996). With the growing uncertainty about terrorism throughout the world and diplomats being a soft target to it, the stress which accompanies this uncertainty is dealt in an emotionally sensible manner. This may be a reason that Foreign Diplomats use emotion focused coping.

Another reason for Foreign Diplomats to have a higher emotion focused coping than IFS officers may be that they are so far away from their own culture that they may be in more need for emotional support. Individuals who are well integrated in their communities and have strong, supportive social relationships are more resilient (Hobfoll, Canetti-Nisim and Johnson, 2006). Emotional support seeking has been recognised as an effective strategy to fight stress and negative emotions (Thoits 1995). Beutell, O'Hare, Schneer, and Alstete (2017) found that expats when posted in a country use emotion focused coping. Social and psychosocial supports from host-country mentors and friends and/or colleagues have also been found to be effective in reducing stress for expatriate managers (Jassawalla, Asgary and Sashittal, 2006).

Facing stress in diplomatic life is not an alien concept for diplomats. Sometimes the situations can get so overwhelming that diplomats may choose to forget or avoid these situations. They may engage in passive behaviours to cope with stress. Instead of taking action to solve the problems or the resulting negative emotions, people resort to escapism, whereby individuals isolate themselves, escape from stress, and/or avoid the problem (Beasley, Thompson and Davidson, 2003). Anticipated cultural differences may end in frustration, resentment and withdrawal. Consequently, individuals attempt to minimize anxieties through physical or mental withdrawal from the situation or by avoiding the problem.

Selmer (2002) found that Chinese expatriates who were living overseas rarely used problem-focused coping strategies, such as showing tolerance and patience and using responsible problem solving, but more often applied avoidance coping strategies, such as resorting to parent-country escapism.

CONCLUSION

Thus, overall it can be concluded that Foreign Diplomats posted in India used emotion focused and avoidance coping strategies more as compared to Indian Foreign Service Officers. These findings bring us face to face with the various coping methods employed by one of the most important and elite class in the entire world. As the world is becoming a smaller unit with each passing day, and stress becoming a part and parcel of our lives, it is but obvious that all of us need each other and would do well to have friendly relations among ourselves. Good diplomatic relations are imperative in which the diplomatic community takes centre stage. In order to maintain this peace and calm, the diplomats are doing their bit by dealing efficiently with their stress by employing various coping strategies. It thus, becomes the duty of the state and every citizen to supplement the coping strategies by keep the diplomats in a positive and welcoming environment. This will help India in taking another step towards healthier relations with the world.

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GST on FMCG Sector – An Overview

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ABSTRACT

GST is one in all the foremost vital tax reforms in Republic of India that has been long awaiting call. The introduction of GST in Republic of India may be a substantial shift from the present tax regime. GST stands for ‘Goods and Services Tax’ enforced by the govt. of Republic of India since first Gregorian calendar month, 2017. GST was outlined as a comprehensive consumption-based tax levied upon manufacture, sale and consumption of products furthermore as services that helped in reworking the country into one unified international organization. product and Services Tax (GST) may be a proportion tax on price accessorial (the distinction between sales and also the value of purchased material inputs) at every stage of production. The aim of this analysis paper is relating to impact of GST and its impact on FMCG sector. FMCG sector plays a foreign role, wherever GST that subsumed most of the indirect taxes within the country would have impact on the FMCG merchandise. The study is predicated on secondary information. varied journals, magazines, Newspapers were referred by the man of science for grouping such information.

Keywords: GST, VAT, Indirect Taxes, Input credit

INTRODUCTION

Fast moving consumer goods (FMCG) is that the fourth largest sector within the Indian economy. There are 3 main segments within the sector – food and beverages, attention and unit and private care that accounts for pretty much half the world. FMCG firms are trying to take a position in energy economical plants to profit the society and lower prices within the long run. Growing brand awareness, easier access and vibrant lifestyles are the main growth drivers in the buyer's market. GST could be a consumption-based tax that has taken the place of varied alternative indirect taxes within the country. it's levied on product and services oversubscribed, factory-made, and consumed. GST includes a wide selection of effects on the FMCG business. as a result of it wedged the highest tier firms, the businesses began rewriting their rates and costs in response to the GST implementation, that benefited the plant by reducing prices, the distributors by reducing transportation prices, and, of course, the shoppers by getting product at a lower cost as a result of the businesses began to revise their Here, we'll target GST's impact on value, provide chain, and a few alternative operational aspects that are concerned in AN FMCG business.

Pre and Post its Implementation

The below provided table explains however HUL, P&G, Nestle, Dabur, Himalaya, and different types of firms are among the GST-affected businesses. consistent with statistics, these firms are taxed at a good rate than before.

Companies Impacted	Hul, P&G	Amul, Nestle, Mother Dairy	Hul, P&G, Dabur, Himalaya, Patanjali	Hul, Dabur, Himalaya, P&G
Product	Detergents	Butter, Ghee, Cheese	Shampoo	Skincare
Previous Rates	23%	4-5%	24-25%	24-25%
Post GST Rate	28%	12%	28%	28%

Tax rates on toothpaste, hair oil, and soaps, on the other hand, have been decreased from 22-24 percent to 18 percent. Colgate-Palmolive, HUL, P&G, and other companies benefit from this.

FMCG goods are vended to the end consumer grounded on Maximum Retail Price (“MRP”), which is inclusive of all levies, including the GST. “Any reduction in rate of duty on any force of goods or services, or the advantage of input duty credit shall be reached on to the philanthropist by way of commensurate drop in prices,” according to Section 171 of the Central Goods and Services Tax Act, 2017 which provides for anti-profititeering measure.

IMPORTANT LITERATURE REVIEW

Author(s)	Year	Results
AYESHA SAFA SAYED MANJUSHA J FEMI ROY	2019	FMCG sector which is an important player in the market sector has been impacted by GST to some extent.
Prof. Rekha D. M1, Swathi. V2	2019	GST implementation affected the consumer the real benefits can be experienced by the consumer only when the utilized tax savings by companies in the form of input tax credit is transferred the FMCG sector by reducing tax bracket and potentially reducing distribution costs for various companies over the long run.
Mr. Adeel Hussain Alie Dr. Javed Iqbal Mr. Sarfraz Ahmed	2019	GST has failed in bringing down overall cost of commodities, interestingly cost of some products has increased much more than cost of pre-GST regime.
Sreekumar P. G Chithra R	2018	Under GST various indirect taxes are subsumed and it would result in a simpler tax regime especially for industries like FMCG.
R Hiremani Naik Sudina T A	2017	GST transition is not just a transition of tax; it impacts every aspect of the business operations and therefore it requires a 'whole of business' approach to ensure a smooth transition.
Dr. Mohan Kumar1 CA Yogesh Kumar2	2017	Presently the peak tax costs for industry players amount to approximately 27% (i.e., Excise Duty of 12.5% and VAT ranging from 12% to 15%). Under the GST regime, it is proposed that the revenue neutral rate would be in the range of 5% to 28%, thereby resulting in significant benefit for the sector.
Mr. Arun Gautam Prof. (Dr.). Gaura v Lo dha	2020	Companies such as Patanjali, ITC, HUL, and Marico have either slashed the prices of goods or increased the volume of the product, extending the tax benefits to consumers under the GST system.
A. D. Manjunath	2021	According to the Data analysis of financial statement most of the company's sales and net profit has significant impact after implementing GST.
R. Elavarasan P. Jagadeesan	2018	where the GST rate is lower than the current tax rates, dealers would try to keep minimum stock and dispose of non-moving stock before the onset of GST.
Gowtham Ramkumar	2017	Consumers are left with less money after GST with highest mean score of 3.57 due to rise in prices.
Ms.N.Ramya Ms.D.Sivasakthi	2017	All sections of economy viz., big, medium, small-scale units, intermediaries, importers, exporters, traders, professionals and consumers shall be directly affected by GST.
Sudipta Chakraborty	2018	Abatement applicable to branded ready-made garments increased from 55% to 70% of the Retail Sale Price.
Dr. Namita Mishra	2018	It will also beneficial to individuals as the prices will go down due to GST and decrease in price leads to increase in consumption and directly increase the GDP.
Milandeep Kour Kajal Chaudhary	2016	Many Indirect Taxes like Sales Tax, VAT etc., will be finished because there will be one tax system i.e., GST, that will reduce compliance present burden.

Dr. Pawan Kumar Singh Sunil Kumar Agrahari	2017	concerns remain on specific issues such as the additional 1% origin tax, increased cash flow issues on account of GST payable on stock transfers, and increased costs owing to exclusion of petroleum fuels from the ambit of GST.
Dr. Rajeev K. Saxena Priyanka Payal	2018	As Prime minister said on the launch of GST is more than just a tax reform it's a new culture of honesty.

RESEARCH QUESTION

1. What is the impact of GST on the companies in the FMCG sector and vendors?
2. How GST is affecting the sales, purchase, net profit of the companies in the FMCG sector (pre and post GST)?

OBJECTIVES

This Research Paper has the Following Objectives

1. To study the impact of GST on the companies in the FMCG Industry in India.
2. To analyse the impact of Goods and Service Tax on the sales, purchases, net profit of FMCG companies pre and post GST.
3. Study the opinion of vendors regarding the implementation of the tax on goods and services.

4. RESEARCH DESIGN

5. STATEMENT OF THE PROBLEM

Impact Assessment of pre-GST and post-GST pricing: Based on the calculated cost, an analysis costs and associated indirect taxes should be applied to both pre-GST and post-GST arrangements. It is therefore necessary to calculate the benefits of a reduced rate or additional input tax credit under the GST regime. In front and post GST regimes, the Harmonized Nomenclature (HSN) system has been used. While comparing the database on HSN is usually not a difficult task, it does get a bit more complex in the case of FMCGs due to the large number of stocks keeping units ("SKUs").

RESEARCH METHODOLOGY

The study endeavours at descriptive analysis based on the secondary data sourced from journals, articles and media reports. The paired t-test is used in this paper, effect of 2 years before GST and after GST implementation.

PROBLEM STATEMENT

This research focuses on the impacts of GST on the companies in the FMCG sector. Research paper studies the variations in the profit, sale, purchases, tax and share prices of the FMCG companies pre and post GST.

This research focuses on the impact of GST on the companies in the FMCG sector and vendors. Research paper studies the variation in the sales, purchase, net profit of the FMCG companies pre and post GST.

SOURCES OF DATA

The secondary source for collection of financial statements of the 10 companies [CITATION htt \1 1033] and stock prices for calculation of abnormal returns pre and post GST [CITATION NSE \1 1033]

Research papers regarding the impact of GST on the FMCG sector [CITATION Cha17 \1 1033] have also been done but they are exploratory in nature and are qualitative in nature.

CONCLUSION

GST is a latest coverage introduced. GST pursues at easier tax regime and transparency in all transaction. FMCG quarter that's a crucial participant withinside the marketplace quarter has been impacted through GST to a few volumes. This study concludes that GST has an effect on numerous elements of FMCG companies. Since it has most effective been 12 months from while the GST regulation got here into force, the volume or diploma of such effect can't be absolutely fathomed. It might require extra time to evaluate whether GST might show to be useful to FMCG companies. As of now, plainly it's far useful to those companies. GST implementation affected the vendors the real benefits can be experienced by the vendors only when the utilized tax savings by companies in the form of input tax credit is transferred the FMCG sector by reducing tax bracket and potentially reducing distribution costs for various companies over the long run.

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The Creation and Evolution of Dalit Literature

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ABSTRACT

Dalit literature was established as a form of literature during the conference in Bombay in 1958 giving identity to the Dalit section of society. Dalit literature emerged in response to concerns specific to the Indian social and cultural history during the last twenty years. The recent spurt in Dalit literature in India is an attempt to bring to the forefront the experiences of discrimination, violence and poverty. The America's Black Panthers movement impacted the most important political organization of Dalit Panthers in India. Dalit literature –had become popular by the authors coming from low caste and marginalized section of society. Dalit literature has encouraged revolutions and movements led by Dalit. It highlights its origin from the age old varna system leading to a feudal caste hierarchy and untouchability. The relevance of 'Ambedkarism' education, political empowerment and social upliftment of the Dalit – children and women were the subjects related to Dalit literature.

Keywords: Dalit literature, Caste Untouchability, discrimination, Dalit Panthers, Varna System, Revolution

INTRODUCTION

Etymologically, the term Dalit has its origin from the Sanskrit word 'Dalita' signifying 'abused'. It implies to a caste that is considered the most reduced and has the least advantages. The fictional works of Bharti Mukherjee, Jhumpa Lahiri, Anita Desai, Kiran Desai, Kavita Dasvani, M.G. Vassanji, V.S. Naipaul, V.R. Shinde and Hari Kunjru contain an overview of the poor condition of the Dalit. They said, "The subordination and subjugation that mark the lives of Dalits in India place them in a context of unavoidable subalternity." Dalit is the story of a collective struggle fought across centuries. Mulk Raj Anand's 'untouchable' portrays the poor and desolate condition. Dr. B. R. Ambedkar and Jyotirao Phule, two of the foremost figures in Dalit history, used the word 'Dalit' as an adjective and a noun to describe the intensity of subjugation of the untouchable Dalit community. The organization of Navanya Buddhism was founded in 1956 by Dr. Ambedkar.

Gautam Buddha was the foremost reformer to preach against eliminating untouchability. The formation of Brahm Samaj by Raja Ram Mohan Ray helped in modernizing the Indian society and eradicating untouchability. The Arya Samaj and the Ramakrishna Mission also denounced untouchability. Dalit literature advocated the Neo Buddhist movement 'Nava Yojna'.

VARNA SYSTEM

The earliest social system was a hierarchical system known as the Varna System. The caste system was developed, by the Rigveda. The Brahmanic literature referred to a really perfect social stratification of the Varna System. It propagated those men are born as Brahmanas ('clergymen'), Kshatriyas ('warriors'), Vaisyas ('investors'), or Sudras ('labourers'). The Vedas did not guide the view that the Brahmins (priestly elegance are of a better caste and that the Shudras are of lower caste). As early as the Purusha hymn in the Rigveda, which belongs to a younger stratum of this oldest and maximum-reputable textual content in Hinduism explains that – society is divided into four sections. The fifth section of society developed later comprising of the untouchables of which 'Chandala' became a constituent part. The 'chandalas' (Sanskrit word) were the primitive class which dealt with disposal of corpses and were of the lowest rank of society. Ayogava, Chandala, Nishada and Paulkasa were outside the four – varna division belonging to a fifth division known as 'panchama varna or 'panchamas' meaning the fifth. Mahatma Gandhi reiterated in 1934 "As a Savarna Hindu, when I see that there are some Hindus called avarnas, it offends my sense of justice and truth". The eighty-five-year-old intense campaign against untouchability ended with Gandhi's 150th death anniversary.

'Chandalika' (written by Shreyashee Nag) is the story of a girl from the untouchable caste of India who leads a life of humiliation and degradation, not having being allowed to give water to a higher caste person. The story gives a message against social discrimination all over the world.

DR. AMBEDKAR AND UNTOUCHABILITY

Any form of social discrimination deprived the discriminated Dalit of their rights, denouncing their self – respect and self-esteem. "Ambedkarvada", or Ambedkarism propounds anti – intellectualism dogmatism (Poltinishta) and orthodox (Karmatha)." The 'Dalit Panthers' constitute an Ambedkarite social organization that forms a literature of Namdeo Dhasai, Arjun Dangle, Raj Dhane and J.V Pawar in the 1970's and 19980's followed Buddhism.

Dalit Panthers were motivated by the Black Panther party (a socialist and communist party), that proclaimed to stop social and economic discrimination. Dalit Panther literature consisted of waiters supporting Marathi literature and art in Bombay. The Black Panther newspaper was popular. Raja Dhale's "Kala Swatantrya Din" published in 'Sadhna', was a Black Panthers publication.

B.R. Ambedkar's Republican Party of India, soon had many factions. Devdutt Patnaik on July 2nd 2021 – (18-42 1)st asserted "As long as we see those who clean our homes and our spaces as polluting, there is no chance of dignity of labour or an annihilation of the Caste system." The main principles of Dr. B. R. Ambedkar's theory and literature were the elimination of caste, eradication of exploitation and equal status for these untouchables. He wrote 'Ambedkar Nama' and started several reformation movements of Dalits in Maharashtra. Chaitanya Prabhu initiated the 'Namoo Shudra' movement in West Bengal, which changed attitudes towards untouchables. All these movements aimed to liberate the Dalits from the oppressive forces in Indian society. Dalit writers were so influenced by these movements that they became conscious of their identities of Hindus which distorted. The Varna order with its age-old concepts of Vedas, Shastras and Upanishads. Tarachand Khandekar a Dalit writer writes about strengthening the Dalit movement. According to Bahurao Bagul. Indian literature was dominated by Dalit literature.

MOVEMENTS/ACTS

In 1850, the Caste Disabilities Removal Act theoretically abolished all Indian laws which ventured the rights of those who were participants of any caste or faith. The 1991 Census of India said that Dalit communities were one of the least literate social organizations. 30% of Dalit children did not have fundamental writing and reading abilities. The 1948 Independence of India the government facilitated the monetary and educational interests of the lower caste and the Dalit from social injustices and exploitation. This literary movement was started in the homeland of Dr. B. R. Ambedkar, the crusader of these downtrodden. It was in the 1970s that Dalit literature came in to prominence. Subsequently, it spread to neighboring states of Gujrat, Karnataka, and Tamil Nadu. There was resentment toward those responsible for the current state of affairs. It raised questions about the status and poor condition of the Dalits. 'Hira Dome' is considered to be the first Dalit piece of writing which exposed the cry of an untouchable' (Ek achut Kiah). 'Bharatdurdasa' highlights the short comings of india and hindu society. Maha – Virprasad Dvivedi (1864 - 138) writes about Swami Achyutanand's writings and social movement that revealed the oppressive social structure of that time. Arjun Dangle, a writer and leader of the Dalit Panther movement asserts, "Dalit is not a caste but a realization and represents the experiences, joys and sorrows and struggles of the Pandits in the lower strata of society."

Reforms / Campaigns

As a member of the Dalit minority in India, Beena Pallical talks about her experiences regarding discrimination. She spoke. The Dalit people suffer trauma and suffering across generations as a result of injustice directed at them. A person's stigma follows them from birth until death, affecting every aspect of their lives, including education, housing, work, access to justice, and political participation. Women and girls are frequently sufferers of sexual violence, and trafficking and are especially prone to early and pressured marriage, bonded labour, and harmful cultural practices. With a growing choice to help to meet the challenges dealing with the Dalit, Pallical left a company activity to move to Delhi and work with the country wide campaign on **Dalit Human Rights**. She has been doing this campaign for the last eleven years and is now the overall Secretary of the UN high Commission of Human rights.

Hope for Uniformity and Equality for Merger of Dalit in Society

Beena Pallical opines "I dream that every Dalit child in this country will have the same opportunities as any other kid, so that he or she can become an equal citizen. I wish every Dalit woman is respected for the work she does, and that she is not beaten up and raped just because she is a Dalit. My dream is to be respected just like anyone else at the table if I mention I'm a Dalit." It is important to note that emancipation of Dalit is a continuing process of political and economic reforms. The caste system is a violation to the might of citizens to understand and comprehend more about the challenges and stories one has to analyse. The 11th July 'Una' incident in which the Dalits, four in number were beaten up by a self-appointed crew. In India 25 % of the population in India belong to socially, economically deprived of the basic amenities of food, clothing shelter and education.

Article 17 of the Indian Constitution eliminated the practice of untouchability. The Parliament has the power to penalize the offence of untouchability, **Article 35 of the Constitution**, formed penal law for the offence of untouchability. The renaming of the untouchability offences Act 1955 to the Civil Liberties Act helped the Dalit section of society.

CONCLUSION

The twentieth and twenty – first century policies have helped to improve the condition of the Dalit. Enrolment for the district primary education program helped to improve education facilities and improve the standards of primary education at district level. Social change through political participation has been sought. The governments initiative is to get international assistance by the world Bank and other social and economic funding agencies.

However, institutions' bias still prevails and the police and other authorities are hesitant to record the first information report (FIR). Section 48A of the Indian Penal code are termed as false. In March 2018 it was validated that “the presentation of **atrocities Acts 1958** should not result in perpetuating casteism which can have had an adverse impact on the integration of the society”.

One 14th April 1999 Human Right Watch (HRW) stressed upon the extremity of challenges of the Dalit (called Broken people) has been established, 160 million people being a victim of discrimination of the caste system. Approximately one million people work as menial workers. Every fifteen minutes a crime is committed against a Dalit and about six million women are roped every day. The most noticeable militias the led Ranvir Sena was responsible for the slaughter of 400 Dalit villages in Bihar around 1995 and 1999. Revenge killings were on the rise in 1999 with the Maoist communists (a guerrilla organization).

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Malicious User Detection using Tweet Segmentation Technique

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ABSTRACT

Online social and news media generate rich and timely information about real world events of all kinds because of that the huge amount of data available. Twitter has attracted many users to share and disseminate most up-to date information, leading to large volumes of knowledge produced a day. In the tweet segmentation the number user are tweets and that tweets are stored in segments. Data mining may be a powerful tool which will be used effectively for analyzing large databases and deriving important analytical results. Experiments on two tweet data sets show that tweet segmentation quality is significantly improved by learning both global and native contexts compared with using global context alone. Using analysis and comparison, we show that local linguistic features are more reliable for learning local context compared with term dependency. As an application, we show that prime accuracy is achieved in named entity recognition by applying segment- based part- of speech (POS) tagging.

Keywords: Twitter, Fragmentation, Segments.

I. INTRODUCTION

Micro blogging sites such as Twitter have reshaped the way people find, share, and disseminate timely information. Many organizations are reported to make and monitor targeted Twitter streams to gather and understand users' opinions. Targeted Twitter stream is typically constructed by filtering tweets with predefined selection criteria (e.g.tweets published by users from countryside, tweets that match one or more predefined keywords). Due to its invaluable business value of timely information from these tweets, it's imperative to know tweets' language for an outsized body of downstream applications, like named entity recognition NER event detection and summarization, opinion mining, sentiment analysis and lots of others.

SOCIAL network sites, also called micro-blogging services (e.g., Twitter, Face book, Google+), have spread in recent years, becoming a new kind of real-time information channel. Their popularity stems from the characteristics of portability thanks to several social networks applications for smart phones and tablets, easiness of use, and real-time nature People intensely use social networks to report (personal or public) **real world** events happening around them or just to precise their opinion on a given topic, through a public message. Social networks allow people to make an identity and allow them to share it so as **to create** a community. The resulting social network is then a basis for maintaining social relationships, finding users with similar interests, and locating content and knowledge entered by other users. Social networks are recently employed as a source of data for event detection, with particular regard to road traffic jam and car accidents. We create the logical protocol which helps to detect the malicious user as well as providing the security to the social networking media as like tweeter. Achieved in named entity recognition by applying segment-based part- of Speech (POS) tagging. Social networks **are** recently employed as a source of data for event detection, with particular regard to road traffic jam and car accidents. We create the logical protocol which helps to detect the malicious user as well as providing the security to the social networking media as like tweeter.

II. LITERATURE SURVEY

Twitter has attracted many users to share and disseminate most up-to- date information, leading to large volumes of knowledge produced a day. However, many applications in Information Retrieval (IR) and Natural Language Processing (NLP) suffer severely from the noisy and short nature of tweets. In this paper, we propose a novel framework for tweet segmentation in a batch mode, called Hybrid Segment. By splitting tweets into meaningful segments, the semantic or context information is well preserved and simply extracted by the downstream applications [1].

Many private and/or public organizations are reported to make and monitor targeted Twitter streams to gather and understand users' opinions about the organizations. Targeted Twitter stream is typically constructed by filtering tweets with user-defined selection criteria (e.g., tweets published by users from a specific region, or tweets that match one or more predefined keywords). Targeted Twitter stream is then monitored to collect and understand users' opinions about the organizations [2].

Twitter has involved numbers of users to share and distribute current information, resulting in a huge amount of data produced per day. No. of private and public organizations have been reported to create and control targeted Twitter streams to gather and know users opinions about the organizations. However the complexity and hybrid nature of the tweets are always challenging for the Information retrieval and natural language processing. Targeted Twitter stream is normally constructed by filtering and rendering tweets with certain criteria with the help proposed framework. By splitting the tweet into no. of parts Targeted tweet is then analyzed to know users opinions about the organizations. There is a promising need for early rendering and categorize such tweet, and then it get preserved in two format and used for downstream application[3].

Social networking site (Twitter) has attracted several users to share and distribute most modern data, leading to giant volumes of knowledge created every day. In most of the applications, at the time of IR (Information Retrieval) process, data suffers severely from noise and produces the short nature of the tweets. In the present paper, system uses a framework for segmenting the tweets in the form of batch mode, named as Hybrids. This process easily preserve the semantic data or content by splitting tweets in the form of understandable segments. 'HybridSeg' derives the principal segmentation of each and every tweet by maximizing its sum and the stickiness scores of corresponding candidate segments that are to be maintained. HybridSeg is additionally intended to iteratively gain from condemn sections as pseudo criticism. Experiments show that tweet segmentation quality is significantly improved [4]. Individuals tweet quite 100 Million times a day, yielding a boisterous, casual, yet here and there educational corpus of 140-character messages that mirrors the zeitgeist in an exceptional way. The execution of standard NLP instruments is extremely corrupted on tweets. This paper addresses this issue by re-assembling the NLP pipeline starting with grammatical form labeling, through piecing, to named-element acknowledgment. Our novel T-NER framework copies F1 score contrasted and therefore the Stanford NER framework. T-NER influences the excess characteristic in tweets to accomplish this execution, utilizing Labeled LDA to abuse Freebase lexicons as a wellspring of far off supervision. Labeled LDA beats co-training, expanding F1 by 25% over ten regular element sorts [5].

Tweets provide a continuous update on current events. However, Tweets are short, personalized and noisy, thus raises more challenges for event extraction and representation. Extracting events out of Arabic tweets may be a new research domain where few examples – if any – of previous work are often found. This paper describes a knowledge-based approach for fostering event extraction out of Arabic tweets. The approach uses an unsupervised rule-based technique for event extraction and provides a named entity disambiguation of event related entities (i.e. person, organization, and location). Extracted events and their related entities are populated to the event knowledge domain where tagged tweets' entities are linked to their corresponding entities represented within the knowledge domain [6].

Machine learning classifiers have recently emerged as a way to predict the introduction of bugs in changes made to source code files. The classifier is first trained on software history, then went to predict if an impending change causes a bug. Drawbacks of existing classifier-based bug prediction techniques are insufficient performance for practical use and slow prediction times thanks to an outsized number of machine learned features. This paper investigates multiple feature selection techniques that are generally applicable to classification-based bug prediction methods. The techniques discard smaller features until optimal classification performance is reached. The total number of features used for training is substantially reduced, often to but 10 percent of the first [7].

A Tweeter is that the Social Media Network to demonstrate the various quite language which having an independent nature of classifiers, presenting an result on the several text classification. A classification problems text general classification and topic detection in several language forms like Greek, English, Dautsch and Chinese. Then the study on key factors within the CAN (i.e. Chain Augmented Naive) model which will influence the classification performance of the worldwide context and native context. Two novel smoothing techniques variation of Jelinek-Mercer and linear inter polation technique which perform existing methods. Natural languages are filled with collocations, recurrent combinations of words that occur more often than expected accidentally which correspond to arbitrary word usages [8]. Event detection from tweets is a crucial task to know the present events/topics attracting an outsized number of common users. However, the unique characteristics of tweets (e.g., short and noisy content, diverse and fast changing topics, and enormous data volume) make event detection a challenging task. Most existing techniques proposed for well written documents (e.g., news articles) can't be directly adopted. In this paper, we propose a segment-based event detection system for tweets, called Tweets [9].

Now a day's software companies spend nearly 45% of cost in dealing with software bugs. A lot of your time and money is wasted find solution to the bugs. To overcome manual work problems during this project we are using text classification techniques for automatic bug triage. For example if we discover any bug while performing on project we've to look in Google for solution if we cannot find solution such a lot time and money is wasted. 11. So in our project we are creating web application for commercial companies. In this website employee can query about bugs. Notification will attend remainder of employee within the company if they're ready to solve the bug they will update the answer to the bug repository. So finding solution to the bugs is easy. Noisy data may mislead the info analysis techniques while redundant data may increase the value of knowledge processing. In bug repositories, all the bug reports are filled by developers in natural languages [10].

The low-quality bugs accumulate in bug repositories with the expansion in scale. Illustration of reducing bug data for bug triage. Presents the framework of existing work on bug triage. Before training a classifier with a bug data set, we add a phase of knowledge reduction, which mixes the techniques of instance selection and have selection to scale back the scale of bug data. In bug data reduction, a drag is the way to determine the order of two reduction techniques supported the attributes of historical bug data sets, we propose a classification method to predict reduction.

Recognizing names and linking them to structured data is a fundamental task in text analysis. Existing approaches typically perform these two steps using a pipeline architecture: they use a Named Entity Recognition (NER) system to find the boundaries of mentions in text, and an Entity Linking (EL) system to connect the mentions to entries in structured or semi-structured repositories like Wikipedia. However, the two tasks are tightly coupled, and each type of system can benefit significantly from the kind of information provided by the other. We present a joint model for NER and EL, called NEREL, that takes a large set of candidate mentions from typical NER systems and a large set of candidate entity links from EL systems, and ranks the candidate mention-entity pairs together to make joint predictions[11].

Twitter has allowed millions of users to share and spread most up-to-date information which results into large volume of data generated every day. Due to extremely useful business information obtained from these tweets, it is necessary to understand tweets language for downstream applications, such as Named Entity Recognition (NER). Real time applications like Traffic detection system, Early crisis detection and response with target twitter stream required good NER system, which automatically find emerging named entities that are potentially linked to the crisis and traffic, but tweets are infamous for their error-prone and short nature [12].

Increased popularity of social media sites such as Twitter, Facebook, Flickr, etc. have produced an enormous amount of spatiotemporal data. One of the application of this type of data is event detection. Most of event detection techniques have focused on temporal feature of data for detecting an event. However, location associated with data has to be taken into consideration to detect locality based event (local event) such as local festival, sporting event or emergency situations. Users in proximity of the location of an event are more likely to post messages about an event compared to users distant from the location of that event. In this paper, we are proposing a framework, called EventStory. Our framework first identifies locally significant key-words (LSK) by monitoring changes in the bursty nature of keywords in both local and global regions [13].

Twitter is attracting as lot of user using twitter. Many type of data will be stored and share on twitter hence large amount data produced every day. As using tweets the context data will be spitted accurately into segment. For the latter, propose and evaluate the models to derive local context by considering the linguistic features and the term dependency in a batch of tweets, respectively[14].

A Tweeter is the Social Media Network to demonstrate the different kind of language which having an independent nature of classifiers, presenting an result on the several text classification. A classification problems text general classification and topic detection in several language forms like Greek, English, Dautsch and Chinese. Then the study on key factors in the CAN (i.e. Chain Augmented Naive) model that can influence the classification performance of the global context and local context. Two novel smoothing techniques variation of Jelinek-Mercer and linear inter potation technique which perform existing methods [15].

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control targeted Twitter streams to gather and know users opinions about the organizations. However the complexity and hybrid nature of the tweets are always challenging for the Information retrieval and natural language processing. Targeted Twitter stream is normally constructed by filtering and rendering tweets with certain criteria with the help proposed framework[16].

Many recent studies have documented the success of cross-project defect prediction (CPDP) to predict defects for new projects lacking in defect data by using prediction models built by other projects. However, most studies share the same limitations: it requires homogeneous data; i.e., different projects must describe themselves using the same metrics. This paper presents methods for heterogeneous defect prediction (HDP) that matches up different metrics in different projects[17].

III. PROPOSED METHODOLOGY

Algorithm 1:

K-Means Clustering: - may be a method of vector quantization, originally from signal processing that aims to partition n observations into k clusters during which each observation belongs to the cluster with the closest mean (cluster centers or cluster centroid), serving as a prototype of the cluster. This leads to a partitioning of the info space into Verona cells. It is popular for cluster analysis in data processing. K- Means clustering minimizes within- cluster variances (squared Euclidean distances), but not regular Euclidean distances, which might be the harder Weber problem: the mean optimizes squared errors, whereas only the geometric median minimizes Euclidean distances. For instance, better Euclidean solutions are often found using k-medians and k-medoids.

Algorithm Steps

1. Input total tweets (1.....n)
2. Tokenization
3. Comparing with data dictionary
4. Count the frequency
5. Add the tweet in the respective cluster.

Working:-The first algorithm used is the tweet stream clustering algorithm.

1. In this algorithm the total number of tweets are taken into account that means the each and every tweet are given the numbers from 1 to n.
2. Then single tweets are tokenized that means the each and every word from the tweets are given the unique number is known as token and the process is known as tokenization.
3. The each and every token are compared with the words in the dictionary. The dictionary must consist of all the words which are related to the clusters. The comparison between the tokens and the words in the dictionary is made successfully.
4. After that the frequency is counted which means that which word in the tweets are belonging to which word in the dictionary. The maximum words in the tweets are belonging to the particular cluster then those tweets are put into that cluster.
5. If that tweet successfully belongs to that cluster then that tweet is added to that cluster. The same step is followed for all the tweets.

Assignment step: Assign each observation to the cluster with the closest mean: that with the smallest amount squared Euclidean distance. Mathematically, this means partitioning the observations according to the Verona diagram generated by the means.

Where each X_p is assigned to precisely one $S_i(t)$, albeit it might be assigned to 2 or more of them.
Update step: Recalculate means (centroids) for observations assigned to every cluster.

$$m_i^{(t+1)} = \frac{1}{|S_i^{(t)}|} \sum_{x_j \in S_i^{(t)}} x_j$$

The algorithm has converged when the assignments not change. The algorithm isn't bound to find the optimum.

Algorithm 2:

Event Detection: - The traditional event detection algorithms adopt TF-IDF mechanisms to detect and track events in news articles and micro blog tweets with different variations. Over the years, various sorts of event detection algorithms are proposed when it involves event detection in micro blogs where the length of tweet content is comparatively short. In Chinese micro blogs, the length of every tweet is strictly confined to no quite 140 Chinese characters and consequently, the normal news story hot event detection algorithms are inappropriate for analyzing tweet contents. QimingDiao proposed a top-ranked LDA method that simultaneously captures two basic observations of micro blog hot topics. Xun Wang proposed a time dependent HDP model to detect events in twitter. Topics models like LDA have served as a really valuable tool capturing latent topics within text and therefore the traditional method for tokenizing text into bag of word format has also been adopted into most of the algorithms for event detections. The tokenizing procedure involves assigning a singular integer to a singular token so each tweet are often represented by a series of integers and that we call the tokenized result tweet vector. After the tokenizing procedure, we need to employ cosine distance to measure the similarity between two tweet vectors. If the cosine distance between two vectors is within a particular threshold, we believe those tweets belong to the same class and hence, they are talking about similar topics. It is the basic approach for text classification

$$S_i^{(t)} = \{x_p : \left\| x_p - m_i^{(t)} \right\|^2 \leq \left\| x_p - m_j^{(t)} \right\|^2 \quad \forall j, 1 \leq j \leq k\}$$

Topic Model: - Various kinds of topic models have been used to generate topics from text documents and the mostly widely used topic model is LDA model proposed by David Blei in 2003. Topic models are algorithms for locating the most themes that pervade an outsized and otherwise unstructured collection of documents. Topic models can organize the gathering consistent with the discovered themes and therefore the intuition behind LDA is that documents exhibit multiple topics.

Steps of Algorithm:

Input: elements of topic-community matrix M , community vector C_i , variable k and total community number N

Output: Global Topic number GT

1. $K = 1$;
2. While $k \leq N$; do
3. Init (C_i);
4. Select top k highest value for each community;
5. $C_i = (M [i, \text{top}1], M [i, \text{top}2], M [i, \text{top}k])$;
6. If the same topic number $\text{top}X$ exists in all community vector C_i then;
7. Global topic $\text{GT} = \text{top}X$;
8. Break;
9. End;
10. else
- 11 $k = k + 1$;
- 12 end
- 13 end A.

Event Cluster Formulation and Central Event Extraction:- After the text classification procedure, there are 16 categories to which all the tweet belong. For each of the tweet categories, we divide tweets in a certain category into different event clusters. We adopt K-means algorithm to formulate event clusters and we intend to choose centroids' C that minimize the in-cluster sum of squares objective function with a dataset X of n samples, the sum of squares objective function is :-

Formula:

$$V = \sum_{i=1}^n \min_{u_i} C(\|x_i - u_i\|)^2$$

We set the amount of iterations to be 10 and number of clusters to be 4. The final results we get after possessing 16 tweet categories are 64 event clusters and each of the event clusters A Multi-layer Event Detection Algorithm for Micro blogs Tan, Zhang, Tan, and Guo 2086 represents a hot event. The next step is to extract key tweets from that event cluster in order to formulate hot events. For the purpose of evaluating which tweet can best represent the hot event in a certain community, we need take several key features of a tweet into account. We have the re-tweeting number and comment number of each tweet to decide the importance of a certain tweet. Also, we need to take the relevance coefficient which is the cosine distance between the tweet vector and the topic vector and the length of tweet i into consideration. The scoring function we employ is describe

$$T_i = (R_i + 2 * C_i) * S_{i,k} * L_i * 10000$$

Where T_i is the number we use to sort the tweets, R_i is the re-tweeting number of tweet i , C_i is the comment number of tweet i , $S_{i,k}$ is the cosine distance between tweet vector i and topic vector k and L_i is the length of tweet i . Then we sort all tweets in a certain event cluster using our scoring function in decreasing order.

IV. RESULT AND DISCUSSION

That chapter includes the results and conclusion of that project. It shows different results provided by the different numbers of tweets. The graphical representations of the tweets versus the number of days are plotted and the current event is detected successfully. The tweets are the messages, viewpoints or opinions of the users which are shared or interchanged on the social services. The tweets are in very large numbers and some tweets may contain the noise or redundancy or may be useless such tweets are discarded by using the tweet stream summarization algorithm.

The tweet posted may be related to the different topics. These all tweets are formed into different groups. These groups are known as clusters. In this case we are clustered in the five groups which are education, politics, sports, Hollywood and business. Finally the current event detection algorithm is used to detect the current event from all the recent event. All these results are represented with the help of graphs. The graph of the number of tweets versus number of days which is to be taken for calculation are plotted for easy understanding of what is happening in the project. The efficiency and effectiveness of the algorithm increased gradually.

V. CONCLUSION

The tweets are the messages, viewpoints or opinions of the users which are shared or interchanged on the social services. The tweets are in very large numbers and some tweets may contain the noise or redundancy or may be useless such tweets are discarded by using the tweet stream summarization algorithm. The tweet posted may be related to the different topics. These all tweets are formed into different groups. These groups are known as clusters. In this case we are clustered in the five groups which are education, politics, sports, Hollywood and business. Finally the current event detection algorithm is used to detect the current event from the entire recent event. All these results are represented with the help of graphs. The graph of the number of tweets versus number of days which is to be taken for calculation are plotted for easy understanding of what is happening in the project. The efficiency and effectiveness of the algorithm increased gradually.

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Human Computer Interaction for the Development of Sixth Sense Robot

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ABSTRACT

Sixth Sense is an interface of gestures which upgrade the physical world around us with digital information and let us use the natural gestures to interact with that information. The advent of technology over the last decade has established a new dimension in the field of Human computer Interaction (HCI). The aim of this paper is to review various gestures, components used, methodology adopted in sixth sense technology and its application

In the following project we are going to create an Arduino UNO robot with motor driver and motor and it is going to be controlled by sixth sense technology using serial communication wires .we are going to provide hand gestures in laptops camera and motor is move accordingly. The gestures will be recognized using edge detection algorithm in opencv.

Keywords: Motion Contolled by hand gesture car, Gesture based car.

I. INTRODUCTION

Sixth sense technology is a revolutionary technology that can change the physical world around us and make it simpler. By using this technology the user can use natural hand gestures to control all the electronic devices in an innovative way. This technology is gaining its popularity because of its usability, simplicity and ability to work on today's scenario

This project introduces the amazing world of sixth sense technology and its fascinating applications. Using an Arduino board and other electronic components, in this project we will develop a robot that can be controlled through digital information. The digital information is processed using the image processing technique which takes the input data from the user who can give commands using hand gestures.

The sixth sense technology makes use of different image processing techniques. A digital colour image consists of RGB (Red, Green and Blue) components in different proportions.

We make use of sixth sense technology for our project. In which we capture the real time image using webcam or using any other camera. The more the sensitivity of the camera the more resolution we get and hence we can use it for long distance sensing of the object. The object captured is processed through some techniques and then its location or position is found out. And corresponding command is given to the robot.

The Sixth Sense Robot Works as Follows:

1. It captures the image of the object in view and track the user's hand gestures.
2. There are colour markers placed at the tip of user's object. Marking the user's object with red, yellow, green and blue coloured object which helps the webcam to recognize the hand gestures. The movements and arrangement of these markers are interpreted into gestures that act as an interaction instruction for the projected application interfaces
3. The laptop processes the image and interprets the hand gestures with the help of the coloured markers placed at the finger tips
4. The information that is interpreted through the laptop is send to bot according which it make movements.

II. LITERATURE SURVEY

Sr. no	Author name	Year	Problem	Method	Advantage/ Disadvantage
1	Manab Kumar Saha, Sirshendu Hore	2017	Sixth Sense is an interface of wearable motions which redesign the physical world around us with advanced data and give us a chance to	The advent of technology over the last decade has established a new dimension in the field of Human computer Interaction (HCI).	Communication by data was not so efficient to be followed.

			utilize the common signals to communicate with that data.		
2	Mr. GadakhPrashant J, KadnarSnehal S., Deshmukh Hemangi K, BhosaleBhagyashri	2016	In image grabbing by using six sense technologies we convert the real world into digital world.	The Gesture Computing is a best innovation that permits hand development and outward appearances as info controls. Numerous gadgets are utilized now-a-days for catching pictures and putting away in their mass stockpiling gadgets gave inside of them like computerized cam with memory cards or fundamental memory, cell telephones with inbuilt memory and memory cards, and so forth.	Image grabbing was so proper that it focus well on picture to get data.

III. IMPLIMENTATION

A. Acquiring Image

The real time video is given by the user. The video is sliced into images at a particular frame rate. In order to obtain the intensity information, the acquired image is converted into grayscale image. This process of acquiring Image is divided into two processes:

1. Image acquisition
2. Segmentation

1. Image Acquisition

The proposed design was performed through recording a video by using a digital camera with a focus of 14 mm then converting this video to a series of images in order to obtain the principle of image processing. Further preprocessing requires the fundamental of cropping.

Cropping: The basic type of preprocessing refers to image cropping. Cropping refers to the removal of the outer parts of an image to improve framing, accentuate subject matter or change aspect ratio. In other words, it refers to removing unwanted areas from a digital image capture.

2. Segmentation

Segmentation is the process of assigning a label to every pixel. In other words, the segmentation is partitioning a digital image into multiple segments "pixels." The goal of segmentation is to simplify the representation of an image into something that is more meaningful and easier to analyze. To perform segmentation we have edge detection.

Edge Detection: Edge detection is the process for detecting meaningful discontinuities in intensity values; to find places where in an image where the intensity changes rapidly.

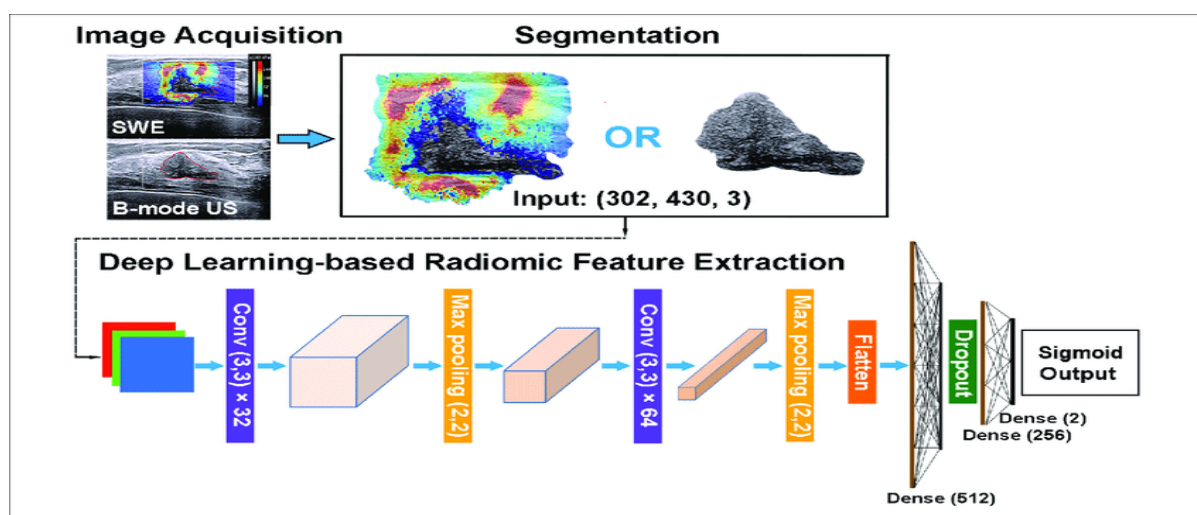


Fig 1: Aquring Image

B. RGB to Grayscale Conversion

RGB image is converted into grayscale image. It converts the true color image RGB to the grayscale image. A grayscale digital image is an image in which the value of each pixel is a single sample, that is, it carries only intensity information. As compared to a colored image, computational complexity is reduced in a gray scale image. All the necessary operations were performed after converting the image into gray scale.

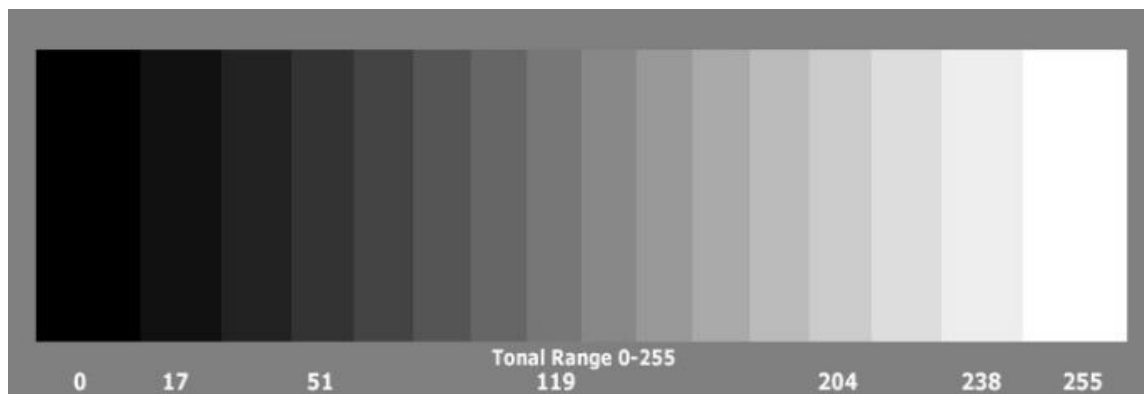


Fig 2: RGB to Grayscale conversion

C. Gray to Binary Scale Conversion

The Gray region of the image obtained after subtraction needs to be converted to a binary image for finding the region of the detected object. A grayscale image consists of a matrix containing the values of each pixel. Image thresholding is a simple, yet effective, way of partitioning an image into a foreground and background. Thus the resultant image obtained is a monochromatic image consisting of only black and white colours. The conversion to binary is required to find the properties of a monochromatic image

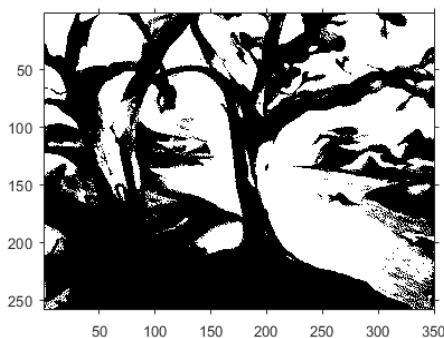


Fig 3: Gray to Binary scale

D. Gesture Recognition

Gesture recognition technique enables humans to interact with computers in a more direct way without using any external interfacing devices. It can provide a much better alternative to text user interfaces and graphical user interface which requires the need of a keyboard or mouse to interact with the computer. Interfaces which solely depends on the gestures requires precise hand pose tracking. In the early versions of gesture recognition process special type of hand gloves which provide information about hand position orientation and flux of the fingers. In the Sixth Sense devices, colored bands are used for this purpose. Once hand pose has been captured the gestures can be recognized using different techniques. Neural network approaches or statistical templates are the commonly used techniques used for the recognition purposes. This technique has a high accuracy usually showing accuracy of more than 95%. Time dependent neural network will also be used for real time recognition of the gestures.

E. Serial Communication between open-cv and Arduino

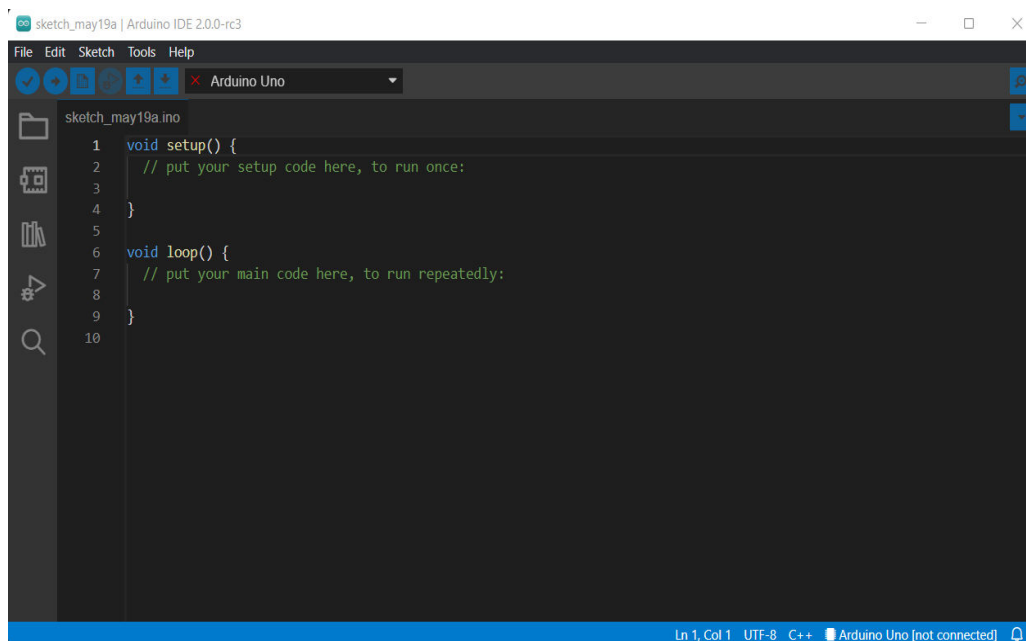
V.CODE

1. Arduino

The Arduino IDE is an open-source software, which is used to write and upload code to the Arduino boards. The IDE application is suitable for different operating systems such as **Windows, Mac OS X, and Linux**. It supports the programming languages C and C++. Here, IDE stands for **Integrated Development**

Environment. The program or code written in the Arduino IDE is often called as sketching. We need to connect the Genuino and Arduino board with the IDE to upload the sketch written in the Arduino IDE software. The sketch is saved with the extension '.ino.'

The Arduino IDE will appear as:



Toolbar Button

The icons displayed on the toolbar are **New, Open, Save, Upload, and Verify.**

It is shown below:



Upload

The Upload button compiles and runs our code written on the screen. It further uploads the code to the connected board. Before uploading the sketch, we need to make sure that the correct board and ports are selected.

The latest Arduino boards can be reset automatically before beginning with Upload. In the older boards, we need to press the Reset button present on it. As soon as the uploading is done successfully, we can notice the blink of the Tx and Rx LED.

If the uploading is failed, it will display the message in the error window.

We do not require any additional hardware to upload our sketch using the Arduino Bootloader. A **Bootloader** is defined as a small program, which is loaded in the microcontroller present on the board. The LED will blink on PIN 13.

Open

The Open button is used to open the already created file. The selected file will be opened in the current window.

Save

The save button is used to save the current sketch or code.

New

It is used to create a new sketch or opens a new window.

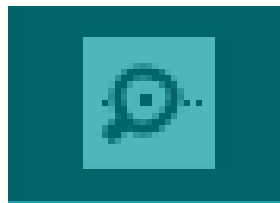
Verify

The Verify button is used to check the compilation error of the sketch or the written code.

Serial Monitor

The serial monitor button is present on the right corner of the toolbar. It opens the serial monitor.

It is shown below:



When we connect the serial monitor, the board will reset on the operating system Windows, Linux, and Mac OS X. If we want to process the control characters in our sketch, we need to use an external terminal program. The terminal program should be connected to the COM port, which will be assigned when we connect the board to the computer.

How Arduino IDE Works?

When a user writes code and compiles, the IDE will generate a Hex file for the code. (Hex file are Hexa Decimal files which are understood by Arduino) and then sent to the board using a USB cable. Every Arduino board is integrated with a microcontroller, the microcontroller will receive the hex file and runs as per the code written.

FUNCTIONS OF ARDUINO IDE

Arduino IDE consists of different sections

1. WindowBar
2. MenuBar
3. ShortcutButtons
4. Text Editor
5. Output Panel



Window Bar

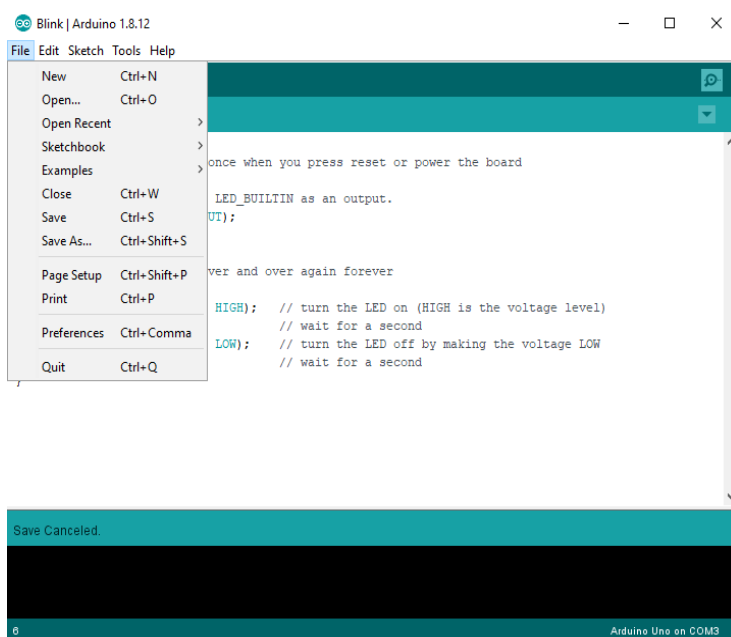
The window bar consists the name of File and the Arduino IDE software version

Menu Bar:

The menu bar consists of

- File
- Edit
- Sketch
- Tools
- Help

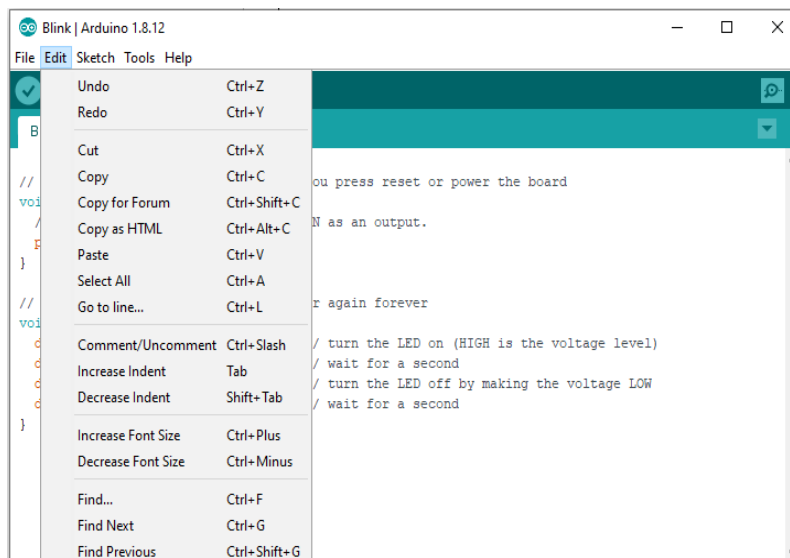
File:



- **New**
It creates a new File. (Ctrl+N)
- **Open**
It is used to open the file which was saved before. (Ctrl+O)
- **Open Recent**
It shows the shortlist of Recently opened programs.
- **Sketchbook**
Shows the current sketches which you have used for your project
- **Examples**
Examples of a few basic problems for reference.
- **Close**
Closes the main screen window. (Ctrl+W)
- **Save**
It is used to save the current sketch. (Ctrl+S)
- **Save as...**
Allows saving the current sketch with a different name. (Ctrl+Shift+S)
- **Page Setup**
Page settings for modifying the page(Text). (Ctrl+Shift+P)
- **Print**
Used to print the current program. (Ctrl+P)

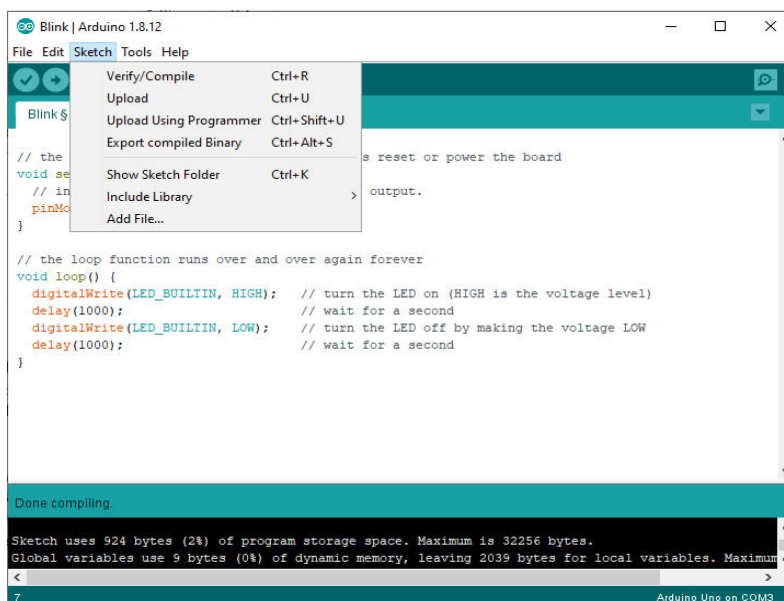
- **Preferences**
Settings of the IDE software can be changed here. (Ctrl+,)
- **Quit**
Closes all IDE windows. (Ctrl+Q)

Edit:



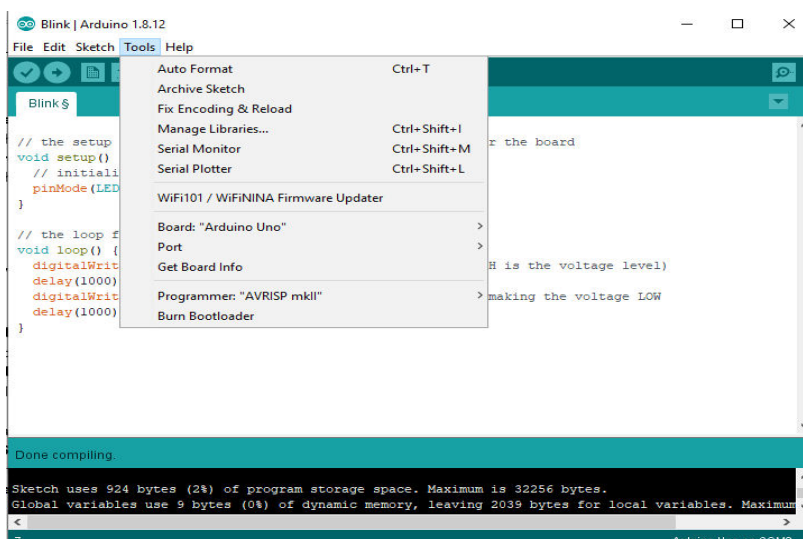
- **Undo/Redo**
Goes back of one or more steps you did while editing.
- **Cut**
Cuts the selected text from the editor.
- **Copy**
Copies the selected text from the editor
- **Copy for Forum**
It copies and changes the style of code suitable for the forum.
- **Copy as HTML**
It copies and changes the style of code suitable for the Html.
- **Paste**
It pastes the text from the copied text.
- **Select All**
Select's all the content from the editor.
- **Comment/Uncomment**
It is used to comment and uncomment selected lines of code.
- **Increase/Decrease Indent**
Adds or removes a space at the beginning of each selected line
- **Find**
Finds the typed text in the editor
- **Find Next**
Finds the next position of the searching word.
- **Find Previous**
Finds the previous position of the searching word.

Sketch



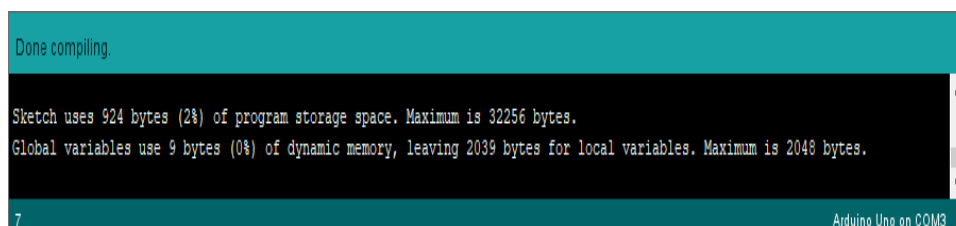
- **Verify/Compile**
Checks or verifies your program if any error is there, and displays in the output panel.
- **Upload**
It compiles and also uploads the code to the Arduino board.
- **Upload Using Programmer**
- **Uploads code using Programmer which is available in Tools Tab.**
- **Export Compiled Binary**
- **Saves a .hex file in the System**
- **Show Sketch Folder**
- **Opens the current sketch folder.**
- **Include Library**
- **Adds a library to your sketch by inserting #include statements at the start of your code**
- **Add File...**
- **Adds a file to the sketch and the new file appear in a new tab in the window.**

Tools



- **Auto Format**
- **This option formats your code to a nice format so everyone can understand.**
- **Archive Sketch**
- **Copies the code into winrar format(.zip)**
- **Fix Encoding & Reload**
- **Fixes possible discrepancies between the editor char map encoding and other operating systems char maps.**
- **Serial Monitor**
- **Serial monitor shows the visual communication by sending and receiving data**
- **Board**
To select the type of Arduino Board
- **Port**
To select the port where you have connected the Arduino
- **Programmer**
For selecting a hardware programmer when programming a board or chip and not using the USB type of communication.
- **Burn Bootloader**
- **It is used to burn bootloader to the Arduino board**

Output Panel:

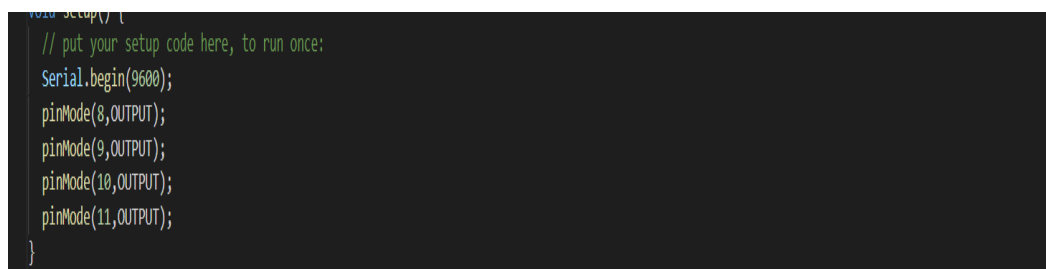


```
Done compiling.  
Sketch uses 924 bytes (2%) of program storage space. Maximum is 32256 bytes.  
Global variables use 9 bytes (0%) of dynamic memory, leaving 2039 bytes for local variables. Maximum is 2048 bytes.  
7 Arduino Uno on COM3
```

This output panel is used to give comments about the code

- if the code is successfully compiled or any error occurs.
- If the code has been successfully uploaded to the board.

Code for Arduino



```
void setup() {  
  // put your setup code here, to run once:  
  Serial.begin(9600);  
  pinMode(8,OUTPUT);  
  pinMode(9,OUTPUT);  
  pinMode(10,OUTPUT);  
  pinMode(11,OUTPUT);  
}
```

Serial begin (9600):

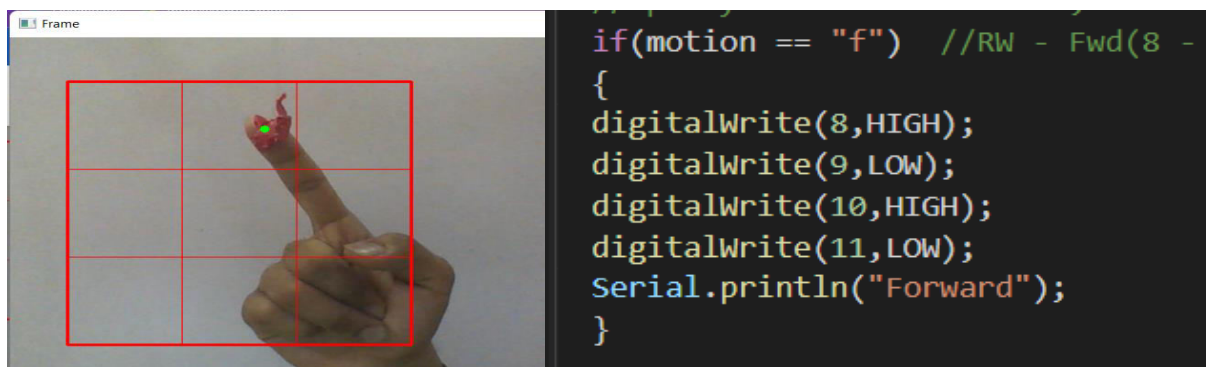
This starts serial communication, so that the Arduino can send out commands through the USB connection. The value 9600 is called the 'baud rate' of the connection. This is how fast the data is to be sent.

Pinmode ():

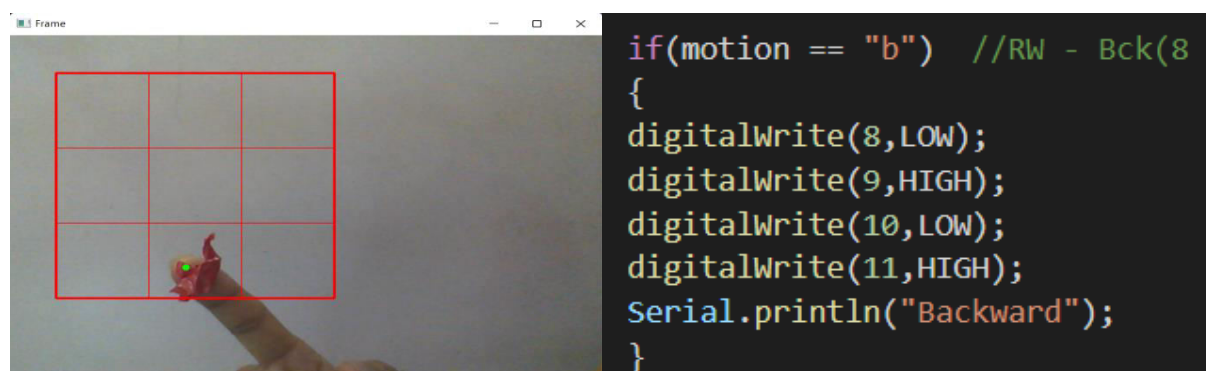
PinMode () configures the specified pin to behave either as an input (with or without an internal weak pull-up or pull-down resistor), or an output.

The above code will run once as it is setting up the robot and configuring on the basis of it.

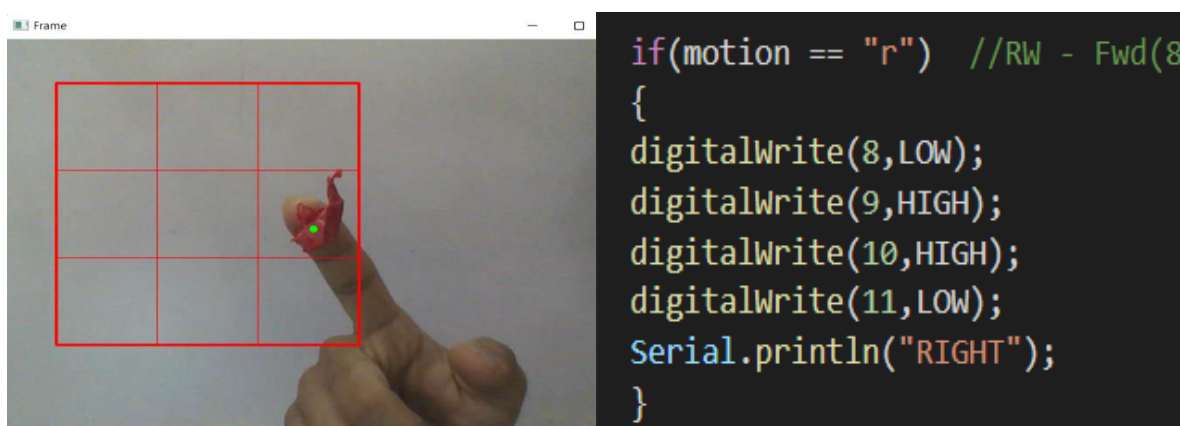
Movement of arduino uno robot on the basis of gestures.



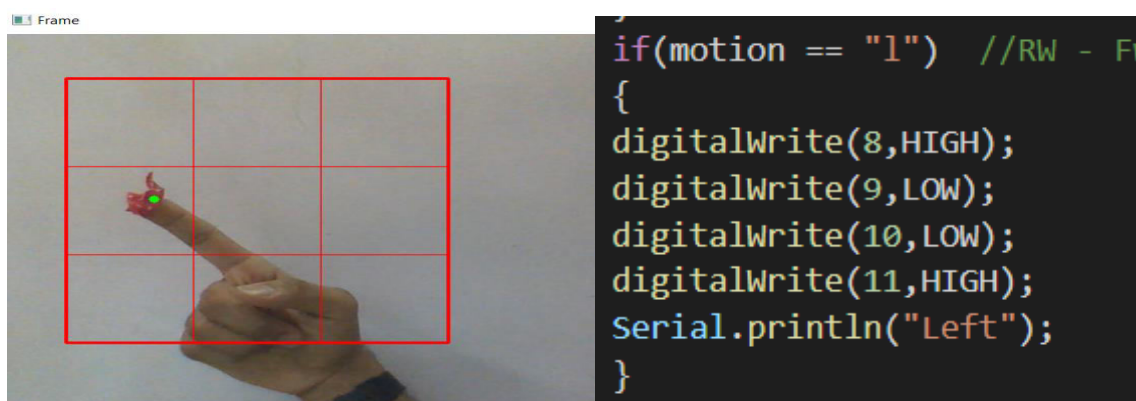
The vehicle will move forward after getting the instructions from the user on basis of gesture



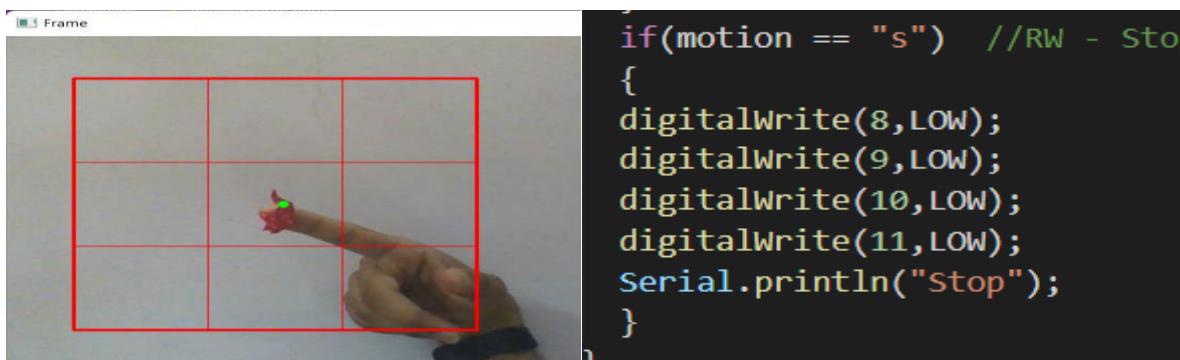
The vehicle will move backward after getting the instructions from the user on basis of gesture



The vehicle will move right after getting the instructions from the user on basis of gesture



The vehicle will move left after getting the instructions from the user on basis of gesture



The vehicle will stop the vehicle if we point it in the middle

IV. CONCLUSION

Through Simplicity and Genuine graphical representations we can make our work much more easy and increase the user interaction and Sophistication. Many of Papers which we have researched were Technology based which includes sixth sense, image grabbing was not sufficient to complete this technology. We have made this in efficient manner and good controllable system/project. It will allow us to control the forward and backward, and left and right movements, while using the Arduino Uno, motor driver, motor, car component etc. Control the throttle of the car based on the hand movements. By using the above mentioned components the hardware was setup, thus resulting in the formation of a robot. In order to implement the experiment a laptop was used, whose web camera acted as the input device for capturing the video. The software part was developed in Python for image processing wherein the hand gestures were analysed to extract the actual direction. Intell ideo was used for developing the python code.

V. FUTURE SCOPE

As we have seen that this proposed model has scope as follow:

- Wireless controlled robots are very useful in many applications like remote surveillance, military etc.
- Hand gesture controlled robot can be used by physically challenged in wheelchairs.
- Hand gesture controlled industrial grade robotic arms can be developed.
- **Entertainment Applications** – Most videogames today are played either on game consoles, arcade units or PCs, and all require a combination of input devices. Gesture recognition can be used to truly immerse a players in the game world like never before.
- **Automation Systems** – In homes, offices, transport vehicles and more, gesture recognition can be incorporated to greatly increase usability and reduce the resources necessary to create primary or secondary input systems like remote controls, car entertainment systems with buttons or similar.
- **An Easier Life for the Disabled** – One of the biggest challenges faced today is providing separate and equally non cumbersome services to the differently abled and handicapped. While there are special provisions around the world, there's still huge room for improvement to bring all lives on equal footing. Gesture recognition technology can eliminate a lot of manual labour and make life much easier for those who aren't as fortunate as most of us are.
- The on board batteries occupy a lot of space and are also quite heavy. We can either use some alternate power source for the batteries or replace the current DC Motors with ones which require less power.
- The proposed system is applicable in hazardous environment where a camera can be attached to the robot and can be viewed by the user who is in his station. This system can also be employed in medical field where miniature robot are created that can help doctors for efficient surgery operations For more efficient response, threshold values can be used to detect gesture and advanced features such as finger counts that provide different functional commands can be used.
- **Entertainment Applications** – Most videogames today are played either on game consoles, arcade units or PCs, and all require a combination of input devices. Gesture recognition can be used to truly immerse a players in the game world like never before.
- **Automation Systems** – In homes, offices, transport vehicles and more, gesture recognition can be incorporated to greatly increase usability and reduce the resources necessary to create primary or secondary input systems like remote controls, car entertainment systems with buttons or similar.

An AI Based Model for Medical Store Management System

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ABSTRACT

The whole pharmaceutical areas needed various innovative and scientific solutions to solve the current problems related to practices, production, documentation, regulatory body requirements, quality of product etc. to overcome such problems different computer system software plays important role by monitoring and maintaining the current practices of pharma industry. By installing such software will help pharma industry to improve their practices and fulfillment of regulatory body's requirements. This article gives overview on different types of software used in pharmaceutical industry. It also covers importance and their need in pharma industry. It also covers the meaning of software used in pharmaceutical industry.

Keywords: Computer Software, Artificial Intelligence.

I. INTRODUCTION

Retail pharmacy is a kind of pharmacy that can be considered as a shop. Through this shop different persons can buy the medicines according to their requirements. Retail pharmacy is also known as the community pharmacy where a community pharmacist works to serve the people in the form of providing required medicines. Community pharmacist also guides the people about the use of medicines. Artificial Intelligence and machine learning are the future of every field. As like the banks, industries, the artificial intelligence should also be used in pharmacy. Most people think that the machine learning and artificial intelligence are the same. But these are not the same in actual there is a little difference. Machine learning algorithms are used by the artificial intelligence devices to perform the actions. The traditional system of health care and pharmacy is not suitable to be adopted in the modern time. In (Iyawa et al., 2017) the researchers said that the current health care system must be changed to respond to the emerging crisis. Sometimes there is a shortage of drugs on pharmacy stores which is a big risk to the health of the people. There is a need for a prediction about the upcoming shortage of the medicines. This shortage is also created when the medicines are stolen by different persons that can be the nurses, pharmacists etc. There should be a way to keep the medicines secure from these type of persons. Most of the time the prescriber recommends the medicine that is known to him instead of the medicine that is most effective. There is a need for a system that can tell about the medicines that are most effective against a disease.. Artificial Intelligence and computer gaining knowledge of are the future of each field. These can be utilized in a subject for higher or environment friendly performance. Both these can be used in retail pharmacy as a answer to one-of-a-kind problems. The desktop studying prediction mannequin can help in predicting the disorder of sufferers and it can additionally be used to predict the remedy for the patient. AI structures can be used to automate the duties that will assist in saving time and additionally the duties will be carried out by way of the usage of fewer resources.

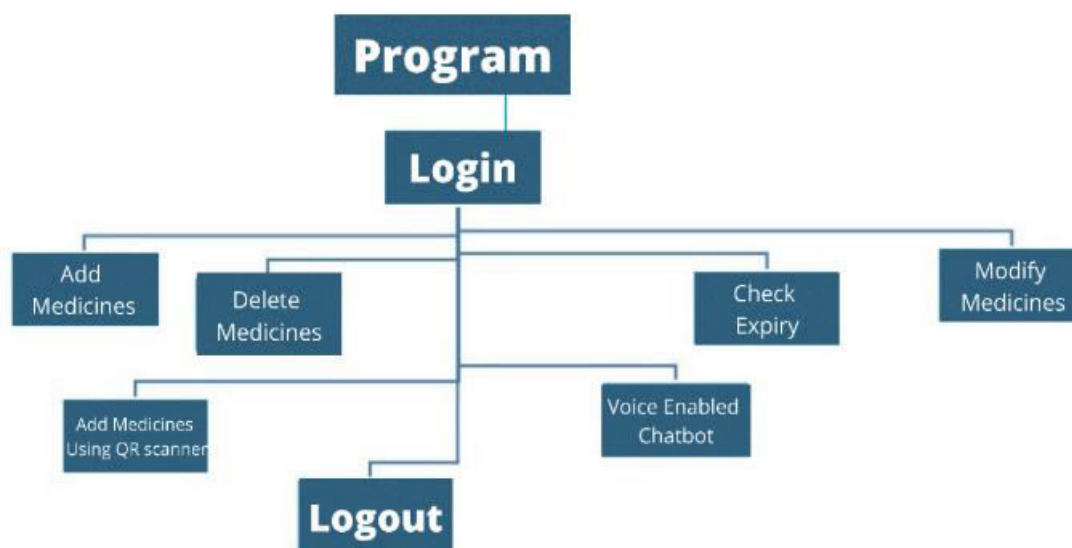


Figure 1: Block diagram of the system

II. LITERATURE REVIEW

In the base paper, an automation is built with modules which focuses on accounting the quantity of Medicines, it is focused on creating an Chat bot by feeding the live data on how much Medicines is added, it uses a database to store the quantity of Medicines each day and later the presented data is represented in inventories in order to check the current days revenue.

The automation modules are connected to the inventory of the store, the medical store management system module keep track of the number of medicines sold which records the revenue of the medicines sold today in order to add more medicines in stock and sends the details to the inventory of store using the automation.

The Existing System of Four Subsystems

1. Normal Inventory
2. Medicine Counting system
3. Options to Add medicines Delete medicines Manually

III. Adaptive CategorizingAlgorithm

The structure programming oversees QR code traces browse from game plans, with the target that we are able to build textual output. That is then added the QR code content to SQL database tables according to the related columns. The full image of the flowchart is shown up in Figure 2.

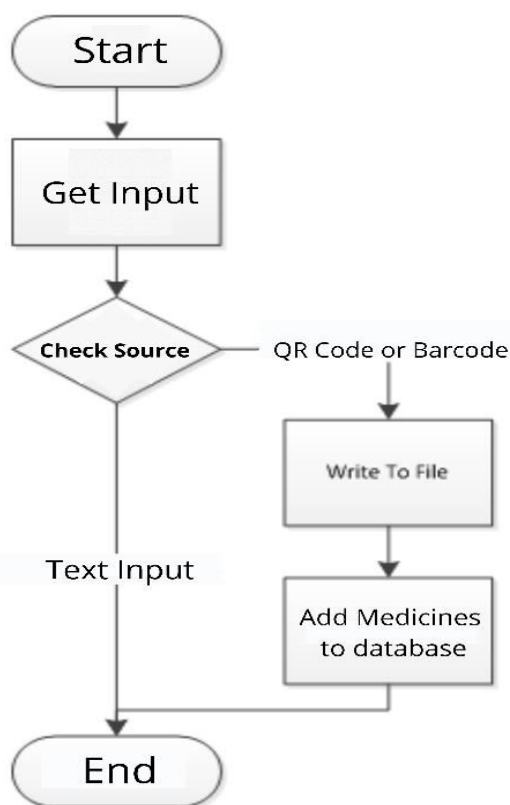


Figure 2: Adaptive Categorizing Algorithm

IV. PROPOSED METHODOLOGY

Till date there was no Software where Medicines are recorded automatically using chatbots and QR code

Chatbot:-It helps to find out expiry dates, stocks, location of medicine in store, etc. As these days if the chemist's have to check any information about the medicines which is in the stock or out of stock they have to check manually by themselves (By checking the medicines name and reading the data of medicines)[4]. This process required bit large amount of time as there are several medicines. So, we implementing the Chabot to reduce the required amount of time for the chemist to search about the information's ex. Expiry date, out of stock info. Etc. it is a program that generates response based on given input to emulate human conversations in text mode. These applications are designed to simulate human-human interactions.

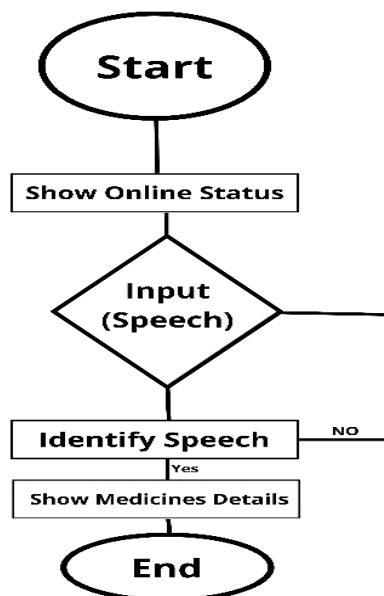


Figure 3: Flowchart for searching the medicine

Scanner:-it helps to manage the record of medicine in medical store by auto filling the stock's data in system by scanning the medicine. Now the days the chemist have to register the medicines stock and medicine stock information manually, which is a lengthy and time consuming process. So we implementing the scanner which will help the Medical store management system to register or fill the information of the new medicines stocks automatically. Scanner will scan the code or the barcode of the medicine box and will get the all informations about the stocks of medicines. After that the scanned information or data of medicine will get automatically filled into the database of the system.

Barcode Scanner: - it makes the bar code of the bill for the customer and customer can scan it to get the bill virtually. These pandemic days it is highly risky to make direct contact with the customer(patients), as there are chances of the spreading or exchanging the germs between the chemist and the customer or patients,So bar code scanner will help to provide a virtual bill for the customer.The customer have to scan the bar code which will be generated by MS management system, with there phones and then the virtually or soft copy of the bill will be in the customers phone.

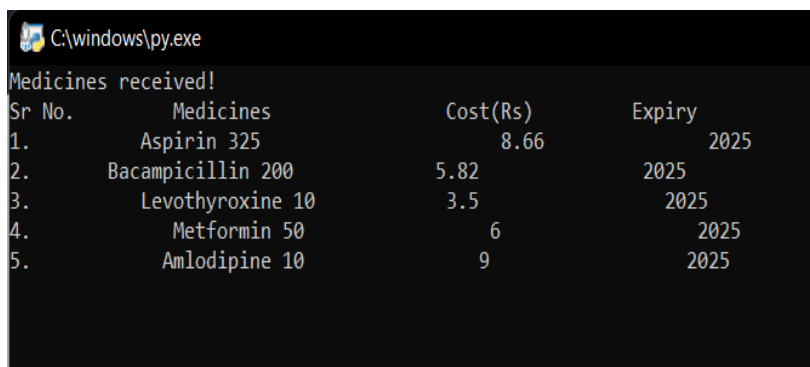
V. IMPLEMENTATION RESULTS

Artificial intelligence is the technology that is making changes in every field. These changes are actually the improvements by the artificial intelligence. Artificial intelligence device can learn from the environment (Michalski et al., 1983) and this is one of the most important attribute of artificial intelligence. These devices can make the action according to their learning. Machine learning algorithms are used to train these artificial intelligence devices. Every field will be using artificial intelligence in the future. Because the artificial intelligence is very helpful to increase the performance.

How Artificial Intelligence saves the time and resources in the retail pharmacy?

Use of artificial intelligence is increasing day by day. All the fields are trying to use artificial intelligence for the better results or performance. AI is beneficial for every field or organization whether it is the banking sector or health. The main advantage of using the artificial intelligence is the saving of time and resources. Different tasks can be performed without human involvement. The artificial intelligence machines can perform these tasks in an efficient way. In (Donepudi, 2016) the researchers proposed a software for the manufacturers that will help in delivering the medicines in cost effective and timely manner. This software uses the artificial intelligence to design, automate, analyze, and monitor human centric and integration centric activities. The authors in (Vyas et al., 2018) in said that the artificial intelligence has many advantages in the field of pharmacy. One of the major advantages is that it reduces the time utilized for making a medicine. This will help in making more medicines in less time. Through the use of Artificial intelligence a good quality medicine can be made in less cost. Money is one of the main resources of a company which must be utilized in a proper way. The use of Artificial intelligence is also helpful for the patients. In (Cai et al., 2016) the author said that through the artificial intelligence the patients can be treated in a good way. Moreover, artificial intelligence can also be used for better treatment in less time.

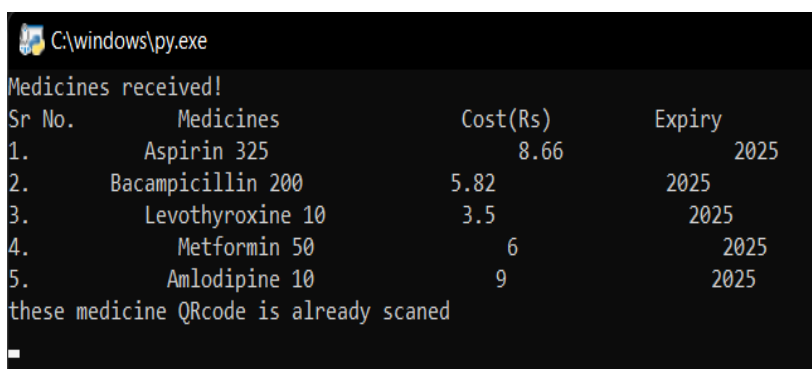
When QR code is scanned the details inside the QR code is displayed in Figure 4



```
C:\windows\py.exe
Medicines received!
Sr No.      Medicines      Cost(Rs)      Expiry
1.          Aspirin 325    8.66          2025
2.          Bacampicillin 200  5.82          2025
3.          Levothyroxine 10  3.5           2025
4.          Metformin 50    6             2025
5.          Amlodipine 10   9             2025
```

Figure 4: First Output

When same QR code is scanned It shows message “These medicines QR code is already scanned” Screenshot in Figure 5



```
C:\windows\py.exe
Medicines received!
Sr No.      Medicines      Cost(Rs)      Expiry
1.          Aspirin 325    8.66          2025
2.          Bacampicillin 200  5.82          2025
3.          Levothyroxine 10  3.5           2025
4.          Metformin 50    6             2025
5.          Amlodipine 10   9             2025
these medicine QRcode is already scanned
```

Figure 5: QR code already scanned

CONCLUSION

The study shows the importance of artificial intelligence and the machine learning algorithms. It is clearly described how the artificial intelligence can be used for saving the time as well as the resources. The retail pharmacy must have to adopt this for the better performance. Instead of giving the known medicine, the pharmacist can provide the effective medicine to the patient with the help of machine learning prediction algorithms. These algorithms can be used for predicting the disease of a patient and can also be used for predicting the medicine for that disease. The future work can be the implementation of these machine learning algorithms so that the correct medicine can be provided to the patients. This will save the time and will provide the more accuracy.

This paper solely covers the improvement method of the Medical Store Management System. The researchers frequently center of attention on growing a machine that will electronically streamline the operations and transactions in a Medical Store. The researchers will enhance a undertaking that is confined solely to clinical stores. The researchers will collect a pattern dimension of taking part clinical shops and their workforce to take part in assessing and checking out the system.

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Webflex - A Responsive Website Template for Instant Deployment

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ABSTRACT

The Ed-tech industry in India is growing rapidly; the pandemic has accelerated it even further. Many individuals and firms have leveraged the internet as a space to connect and teach digitally to people across the globe and help upskill them. Selling online courses and programs is a huge market already and will keep expanding for years to come with rise in more and more start-ups, freelance educators, coaches, and mentors. Through our website template, we want to provide an easy to edit and deploy website template for all such purposes. Webflex would be a website template that can be used by individuals to make a website for their brand easily and effectively. This website template can be used not just by ed-tech firms or individuals, but by anybody who wants to provide any kind of coaching, mentoring, or certain services online.

Keywords: Ed-tech, Educators, Start-ups, Website Template.

1. INTRODUCTION

Digital Presence of any company or individual who wants to sell or give services digitally is complete without have a proper website. The purpose of Webflex is to give a quick and ready to use solution for start-ups, firms and individuals in their early stage to deploy a website of their own and kick start their digital journey. This website template has been made using Bootstrap 4 code. Keeping in mind the importance of visual appeal and retention in the digital world, efforts have been taken to make its UI/UX look attractive and clean. The concept of Search Engine Optimization was also frequently used throughout the whole project, The Rankings we got were pretty convincing and we hope that the customized website will appear in at least top 20 searches on google. We also kept in mind the user perspective on how they like to use popular websites. Like for example most of the popular websites that people use today has a log-out button on the Top-right corner, we considered all these small things before developing our template.

2. LITERATURE SURVEY

Before implementing this website template, a lot of papers regarding the usability of websites was done. The Assessment of website usability has attracted a lot of researchers recently. [1] There is no doubt anymore that if a website is made considering the usability standards in mind, then it will significantly improve the user's experience. [2] If we talk about specific users who are most affected by a bad design of a website then old generation comes to mind, even experienced old adults face difficulty in operating a website with poor usability tools. Suppose for a Healthcare Website.[3] More of the older adults are turning to the internet for a Health-care related advice and the information is not always that accurate. A very interesting usability experiment was conducted in which almost 37 older adults were involved. [3] They were given some very simple tasks to perform and Various methods of participation was Utilized like Video Conferencing, Telephonic conversation and personal testing. Almost 70 percent users failed to complete a task, the researchers concluded that the satisfaction of the end user through the design is very important. It was very difficult to search for information on the website and one of its main reasons was the language used to inform the users of the services provided by the website. A Research study was conducted in Nigeria to show the importance of end user inclination in a health-care website. The study was focused through the end-user's perspective, therefore focusing more on design features and contents. Various themes were carefully planned for testing the website and the user responses were examined on the basis of Usability metrics. Through the experiment importance of an effective healthcare delivery system was Conveyed. [4] One of the most Important findings was that many users wanted to directly contact the Hospitals online but they were unable to do so, mainly because of the websites lack of organization and management mechanism. Some of these findings can be used by the hospitals to improve the e-tools of their websites. The conclusion made was that the end user's experience should not be ignored and in fact should be given as much importance as the design and content of the website. The best possible way to do that is to start thinking from the user's perspective at the very beginning of the project. [5] Online Health information is also a major aspect for a healthcare institution, a research study was developed to evaluate such kind of websites. While evaluating, it was found that the proper procedures were not used to design the websites. Even more than that it was found that the people with disabilities were completely ignored while making the website, meaning the website ultimately became less fruitful Maintaining the Integrity of the Specifications.

3. SYSTEM DESIGN

Our main focus is to create a web-page template which can be easily used by any startup or a Veteran company. If the company has a Subscription based set-up than our template will help them in keeping a record and managing the client base. We plan to make the Template in the form of an interactive U/I so that New users can know about the company in an Interesting way.

This Django-based Python web page will have many more components like reputed Blogs, Relevant Videos, and Informational Articles.

The Web-page will be very Flexible so that any startup can use it in their required format. They will easily be able to make changes as per their Company values and Goals.

The easily maintained server side will help the company to keep a track of the different subscriptions that a client pays for. The Template will also allow the company to interact with the potential clients and make the most out of their respective products.

4. MODULES

We used various Modules to complete our project mainly focusing on a particular type of fitness website so that the template could look elegant. Some basic things included were

- Home module
- Login module
- Subscription module
- A Pose Page
- Contact page
- About page
- A Blog Module

5. ADVANTAGES/DISADVANTAGES

Advantages

- Online Presence 24/7
- Information Exchange
- Credibility
- Low Cost
- Market Expansion
- Consumer Insights
- Online Customer Service
- Growth Opportunity

Disadvantages

- Not exclusive and unique.
- Specific software required for customization.
- Limitations on customization.

6. FLOW CHART

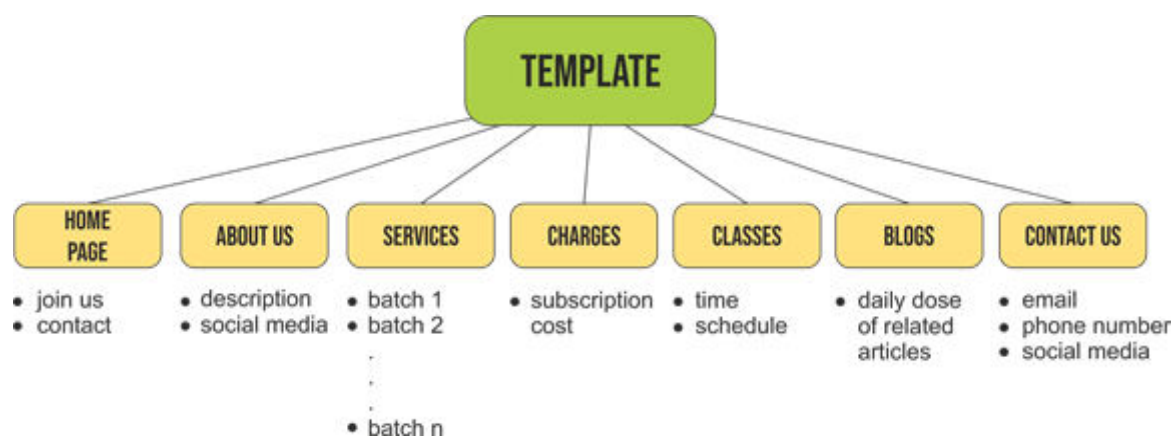


Figure 1: Flow Chart of Webflex

7. CONCLUSION

Through Simplicity and Genuine graphical representations we can make our work much more easy and increase the user interaction and Sophistication. Many of Papers which we have researched were Technology based which includes HTML,CSS,Bootstrap and JavaScript.By using these technologies Website can become more engaging. Through our project we have fulfilled the necessity of making an online presence of a New or Old Startup. A simple change in the template and a good UI design we not only attract the customers but also make them stay at our website longer. Through some simple SEO methods we make our website come on the top 20 searches of google.

8. FUTURE SCOPE

As we have seen that this proposed model enhances and advances in the security and detection of data leakage and even stands with the possibility of what data has been leaked.

We have shown it is possible to assess the likelihood that a user is responsible for a leak, based on the overlap of his/her data with the leaked data and the data of other users, and based on the probability that objects can be 'guessed' by other means or by some means of other techniques.

Our model is relatively simple, but we believe it captures the essential trade-offs. The algorithms we have presented implement a huge variety of data distribution strategies/techniques that can improve the chances of identifying a person in further research work.

We can demonstrate this for dynamic block level operations on some encrypted data blocks for various operations such as insertion, deletion and updating, which we consider is our improvement for our work.

The future scope of the proposed work includes easier accessibility for non-technical users by providing a Graphical User Interface (GUI) level interface.

Our future work includes the investigation of the agent guilt models that capture leakage scenarios that are not studied in this paper.

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A Machine Learning Based Bank-Note Authentication System

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ABSTRACT

Banknotes are one of the most important assets of our country. Some miscreants introduce a currency which is false, and which bears a resemblance to the original note to create discrepancies in the money in the financial market. Counterfeit money is a note that is produced without the legal action of the state or government, it is a serious illegal offense because of the value conferred on money and the high level of technical skill which is important to imitate it. If a faked note is getting used in and remains unobservable, it becomes an important part of the system. As it acts as a tax on the general public in favor of the counterfeiter [1]. It becomes very difficult for humans to identify true and fake banknotes especially because they need tons of comparable features. Fake notes are created with precision, so there is a great need for an efficient algorithm that accurately predicts whether a banknote is real or not. This project proposes machine learning techniques to identify the authentication of banknotes. Indian banknote images are taken as regards to show how a system is often developed for discriminating fake notes from genuine ones. Image processing and pattern recognition techniques are done to design the general approach. The system performance is important in terms of both accuracy and processing speed. A multistage linear discriminant analysis classifier generates stable and reliable output [2].

Keywords: Bank-note, fake-notes, Authentication, currency.

INTRODUCTION

The problem of large-scale counterfeiting of paper currency possesses a very serious problem. In our country, regardless of a decline in the utilization of money because of the ongoing development in the utilization of electronic exchanges, a large amount of fake notes causes economic instability [3]. Counterfeiting of currency notes affects the existence of the monetary equilibrium as its value, velocity output, and welfare get most affected [1]. As counterfeiters also adapt to the new security measures that are incorporated, media reports highlight the alarming rate at which these counterfeits are increasing. This has moved the Union legislators to draft new guidelines so that computer and software manufacturers are forced to introduce new security measures to form it impossible for their products to copy banknotes. To proceed with smooth money exchanges, a section of produced banknotes available for use ought to be saved [5]. The different progressions in the field of scanners and duplicate machines have driven to make duplicates of banknotes. It is troublesome for human-eye to perceive a phony note since they are made with extraordinary exactness to resemble the other like a certified note. In recent years, soft computing techniques have been widely used to solve problems that are difficult to solve using conventional mathematical methods. This paper evaluates supervised machine learning algorithms to classify genuine and fake notes and compares algorithms based on accuracy [2], sensitivity, and specificity. Machine Learning is a highly interesting technology in today's world. We are going to build a machine learning model to authenticate banknotes [9]. However, it is impossible to track and stop all of the counterfeiting efforts in our surroundings, and hence, we need to deploy better authentication systems that will carefully scrutinize notes before allowing them to circulate. The technology for sorting banknotes does not take into consideration the high intricacies involved in security features, the properties of papers, inks, resins, chemicals, etc. is used to print the currency notes, and thus, they're often unable to differentiate the slight discrepancies between fake and genuine notes. A recognition system must be installed to detect the legitimacy of the note. These features are going to be given as input to the machine learning algorithm which can predict if the note is true or fake. The dataset to train these algorithms was collected by extracting features from banknote images. The machine uses some classification techniques to try to do it [7]. There are many different machine learning algorithms for classification. Classification may be a sort of supervised machine learning. There are many different machine learning algorithms within the classification. We will implement the 'K nearest neighbor algorithm, Support vector machine, Perceptron learning & Gaussian naive Bayes' algorithm. Henceforth, there is a desperate need in banks and ATMs to actualize a framework that groups a note as certifiable or phony [8].

METHODOLOGY

Following figure 1 shows the system architecture of the proposed system.

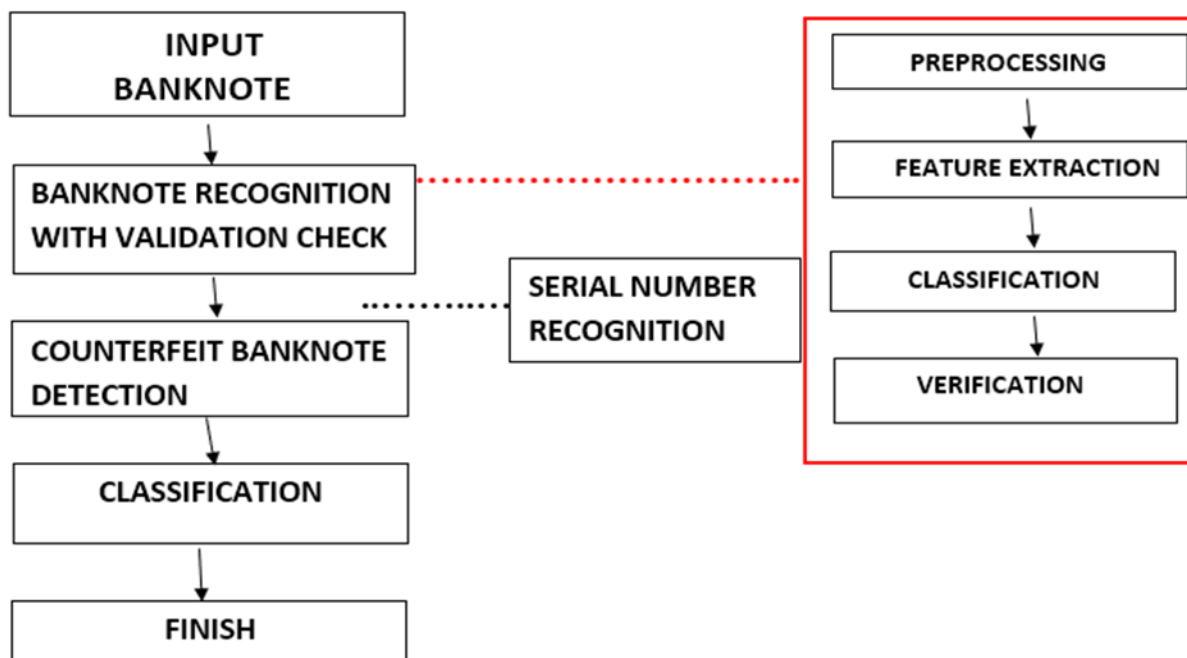


Figure 1: System Architecture

➤ Support Vector Machine Algorithm

- Support Vector Machine is most popular Supervised Learning algorithms, which are used for Classification as well as Regression problems and it is used for Classification problems.
- The important goal of the SVM algorithm is to create the best decision boundary that can segregate n-dimensional space into classes so that we can easily put the new data point in the right category in the future. This is the good decision boundary is called a hyperplane.[3]

➤ K Nearest Algorithm

- K-Nearest Neighbour is one of the easiest Machine Learning algorithms based on the Supervised Learning technique.
- K-NN algorithm assumes the similarity between the new data and available cases and put the new case into the category that is similar to the available categories[6].

➤ Gaussian Naïve Bayes

- Naïve Bayes algorithm is a one of the supervised learning algorithm, which is based on Bayes theorem and it is used for solving classification problems.
- It is mostly used in text classification that includes a high-dimensional training dataset.
- Naïve Bayes Classifier is one of the easiest and largely effective Classifications algorithms which helps in building fast machine learning models that can make fast predictions[8].

➤ Perceptron Learning

- Perceptron is a Machine Learning algorithm for supervised learning of various binary classification tasks[2]
- Perceptron model is also treated as one of the best and simplest types of Artificial Neural networks[7].It is a best supervised learning algorithm of binary classifiers. so, we can consider it as a single-layer neural network with four main parameters, i.e., **input values, weights and Bias, net sum, and an activation function**[3].

MODULES

- **LOGIN PAGE** ; In our system we have two login Pages:

1. **Admin Login Page:** In this Admin login page, only admins have the right to login to the system where the Admin will get all the information about the users and the details about the notes.

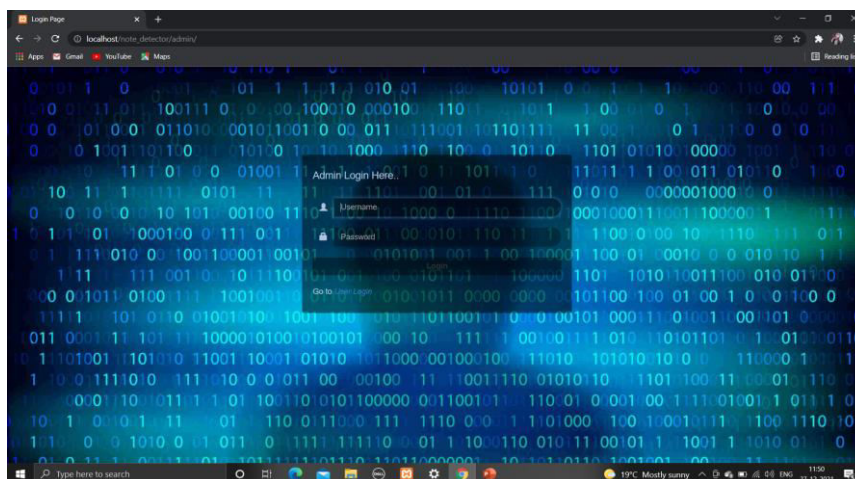


Fig 2: Admin login page

- 2. **Users Login Page:** In this Users login page, the user will first have to make login to the system by creating their own userID and password. This is the one-time process.

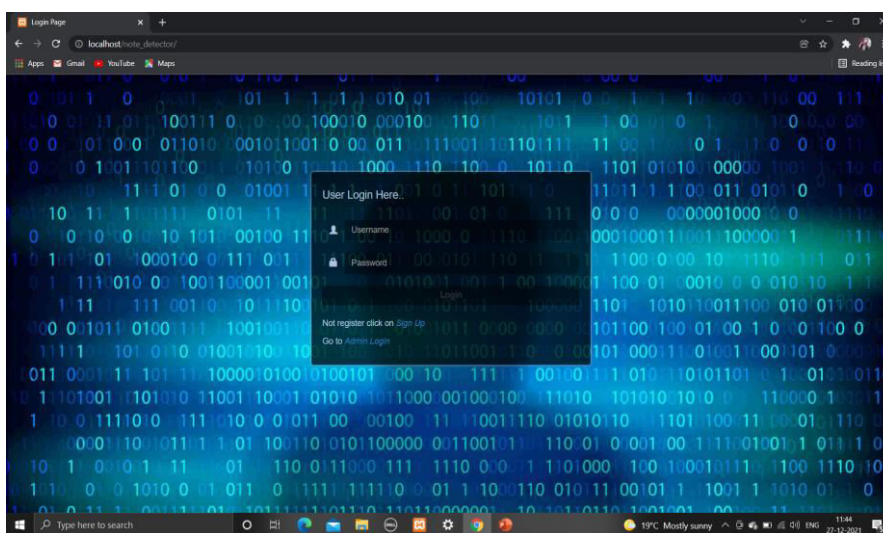


Fig 3: Users Login Page

- **USERS PROFILE DETAILS:** In this module, We had shown the details about the user which they had added to their profile, this profile details can be edited by the user anytime. It includes personal, professional or another skill we have we can add to our profile.

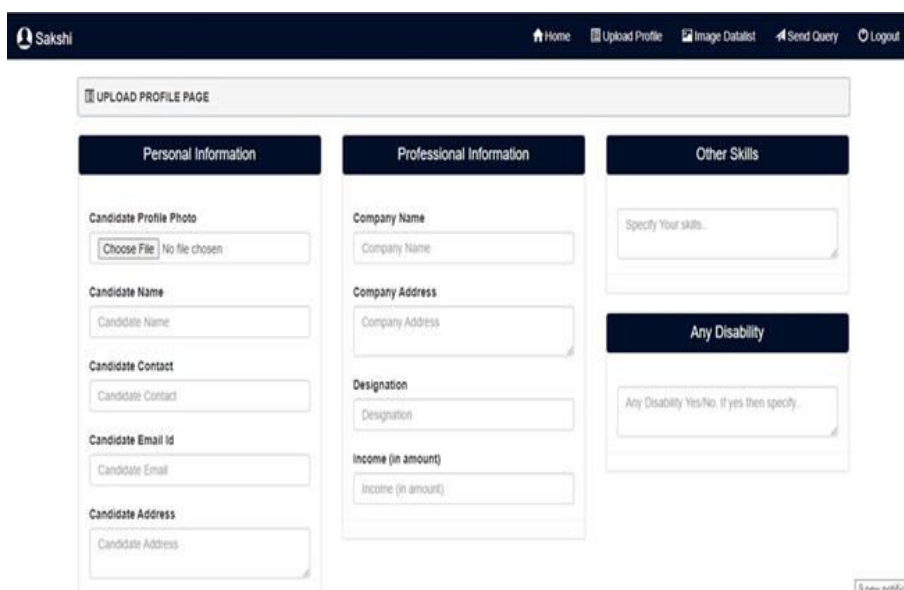


Fig 4: Users Profile Details

- **DATALIST PAGE:** In this module, whatever data images (Notes) we had added for detection, it will get shown in this data list page.

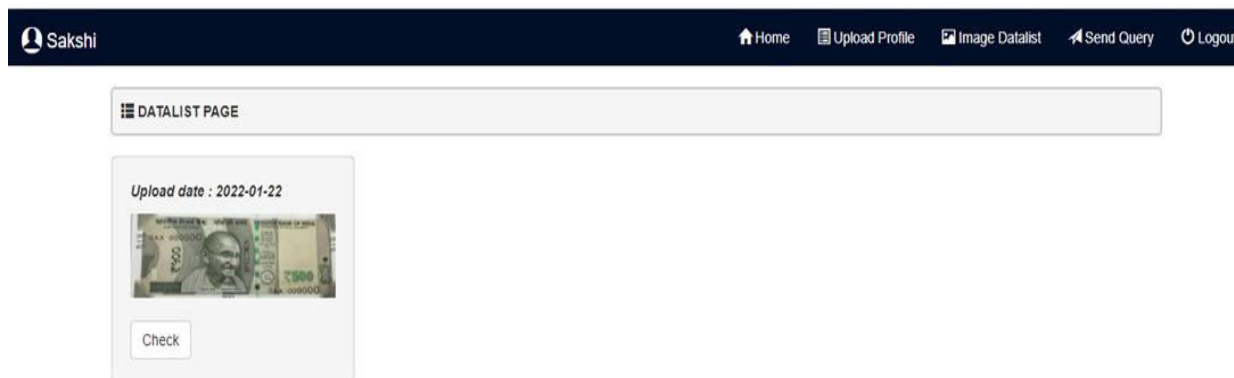


Fig 5: Datalist Page

RESULT ANALYSIS

Banknote authentication is an important task. It is difficult to manually detect fake banknotes. Machine learning algorithms can help in this regard. In this project, we explained how we solved the problem of banknote authentication using machine learning techniques. We compared four different algorithms in terms of performance and concluded that the KNN and SVM algorithms.

FUTURE SCOPE

As we know that we have proposed this system to detect the fake notes which are illegally used in our society. This system will help us in the future to detect fake currency notes by using some algorithms and note Parameters. The model we proposed is very simple to use and user-friendly. This system can be used in banks, a small retail Shops or at many of the places. Our future work includes the detection of Fake notes and making the legal and safe transactions for the banks and users also.

CONCLUSION

ATMs and banknote counters are implemented for large-scale banknote circulation and secure transactions. This study of fake note detection provides an overview of the overall banknote recognition systems and describes in detail each of the steps of banknote recognition, counterfeit banknote detection, and serial number recognition, listing the related studies and describing the methods presented by them. These methods are used to study banknote information (denomination, counterfeit detection serial number) using images or sensor data and can be applied to automated banknote dispensers and similar self-service terminals. As mentioned above, algorithms related to banknote recognition can show different performance characteristics for different notes and numbers of target classes.

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Automatic Leaf Disease Detection for Smart Agriculture Based on Machine Learning and IoT

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ABSTRACT

Agriculture plays vital role in the development of agricultural country. In India about 70% of population depends upon farming and one third of the nation's capital comes from farming. Issues concerning agriculture have been always hindering the development of the country. The only solution to this problem is smart agriculture by modernizing the current traditional methods of agriculture. Hence the project aims at making agriculture smart using automation and IoT technologies. The concept of the study is to eliminate human participation and increase farmer procurement. Farmers rarely have a good crop, reducing their income. Lack of minerals, soil dampness, temperature variations, etc. cause this. High crop disease prevalence affects harvest quality and quantity. Smart agriculture uses IoT sensors to monitor agricultural fields and deliver information. This post creates a Smart Agriculture System using IoT, Android, Wireless Sensor Networks, and Machine Learning. Climate monitoring and early disease identification are key to enhancing agricultural yield. Sensors monitor temperature, humidity, and moisture in the proposed system. This non-destructive method helps farmers discover plant problems earlier. Using three classes of tomato plants (two diseased and one healthy), IoT and ML were used to detect plant illness.

Keywords: plant leaf, USB camera, software, disease of plant, RGB color detection.

INTRODUCTION

Agriculture is considered as the basis of life for the human species as it is the main source of food grains and other raw materials. It plays vital role in the growth of country's economy. It also provides large ample employment opportunities to the people. Growth in agricultural sector is necessary for the development of economic condition of the country. Unfortunately, many farmers still use the traditional methods of farming which results in low yielding of crops and fruits. But wherever automation had been implemented and human beings had been replaced by automatic machineries, the yield has been improved. Hence there is need to implement modern science and technology in the agriculture sector for increasing the yield. Most of the papers signifies the use of wireless sensor network which collects the data from different types of sensors and then send it to main server using wireless protocol. The collected data provides the information about different environmental factors which in turns helps to monitor the system. Monitoring environmental factors is not enough and complete solution to improve the yield of the crops.

There are number of other factors that affect the productivity to great extent. These factors include attack of insects and pests which can be controlled by spraying the crop with proper insecticide and pesticides. Secondly, attack of wild animals and birds when the crop grows up. There is also possibility of thefts when crop is at the stage of harvesting. Even after harvesting, farmers also face problems in storage of harvested crop. So, in order to provide solutions to all such problems, it is necessary to develop integrated system which will take care of all factors affecting the productivity in every stages like; cultivation, harvesting and post harvesting storage. This paper therefore proposes a system which is useful in monitoring the field data as well as controlling the field operations which provides the flexibility.

The paper aims at making agriculture smart using automation and IoT technologies. The highlighting features of this paper includes smart GPS based remote controlled robot to perform tasks like; weeding, spraying, moisture sensing, bird and animal scaring, keeping vigilance, etc. Secondly, it includes smart irrigation with smart control based on real time field data. Thirdly, smart warehouse management which includes; temperature maintenance, humidity maintenance and theft detection in the warehouse.

Plant disease recognition using digital and cell phone camera photos is proving to be difficult. The application of several machine learning algorithms for plant disease categorization has recently become popular, with encouraging results in a few diseases and crops. The development of deep Convolutional Neural Network (CNN) based architectures has considerably improved classification accuracy. In this research, we present a method to monitor farmland using IoT technology, and we employed a VGG16 pre-trained deep learning model to identify two different diseases and a healthy class of tomato crop from an image dataset. Various sensors can send data over the Internet using this approach. Farmers can use a smartphone to remotely monitor their field

from their home. This system creates an intelligent solution for monitoring numerous elements that affect agricultural cultivation as well as increasing crop productivity by detecting plant illnesses early.

LITERATURE SURVEY

The existing method and one of the oldest ways in agriculture is the manual method of checking the parameters. In this method the farmers they themselves verify all the parameters and calculate the readings. It focuses on developing devices and tools to manage, display and alert the users using the advantages of a wireless sensor network system. It aims at making agriculture smart using automation and IoT technologies. The highlighting features are smart GPS based remote controlled robot to perform tasks like weeding, spraying, moisture sensing, human detection and keeping vigilance. The cloud computing devices that can create a whole computing system from sensors to tools that observe data from agricultural field images and from human actors on the ground and accurately feed the data into the repositories along with the location as GPS coordinates. This idea proposes a novel methodology for smart farming by linking a smart sensing system and smart irrigator system through wireless communication technology. It proposes a low cost and efficient wireless sensor network technique to acquire the soil moisture and temperature from various location of farm and as per the need of crop controller to take the decision whether the irrigation is enabled or not. It proposes an idea about how automated irrigation system was developed to optimize water use for agricultural crops. In addition, a gateway unit handles sensor information. The atmospheric conditions are monitored and controlled online by using Ethernet IEEE 802.3. The partial root zone drying process can be implemented to a maximum extent. It is designed for IoT based monitoring system to analyze crop environment and the method to improve the efficiency of decision making by analyzing harvest statistics. In this paper image processing is used as a tool to monitor the diseases on fruits during farming, right from plantation to harvesting. The variations are seen in color, texture and morphology. In this paper, greenhouse is a building in which plants are grown in closed environment. It is used to maintain the optimal conditions of the environment, greenhouse management and data acquisition.

PROPOSED METHOD

Farmers can use an IoT-based system and a mobile application as part of the Smart Agriculture System. On the hardware side, we have an Internet of Things-based system that measures numerous metrics such as soil moisture, temperature, and humidity. An android app for farmers is included in the software section. We created an Android app that is connected to the hardware system via IoT and alerts the farmer so that he or she may monitor the live status of temperature, humidity, and other field factors at any time using the app.

Temperature-Humidity (DHT11), Soil moisture, and other parameters are monitored using an IoT-based system (soil moisture sensor). The IoT system's circuit diagram is shown in the diagram below.

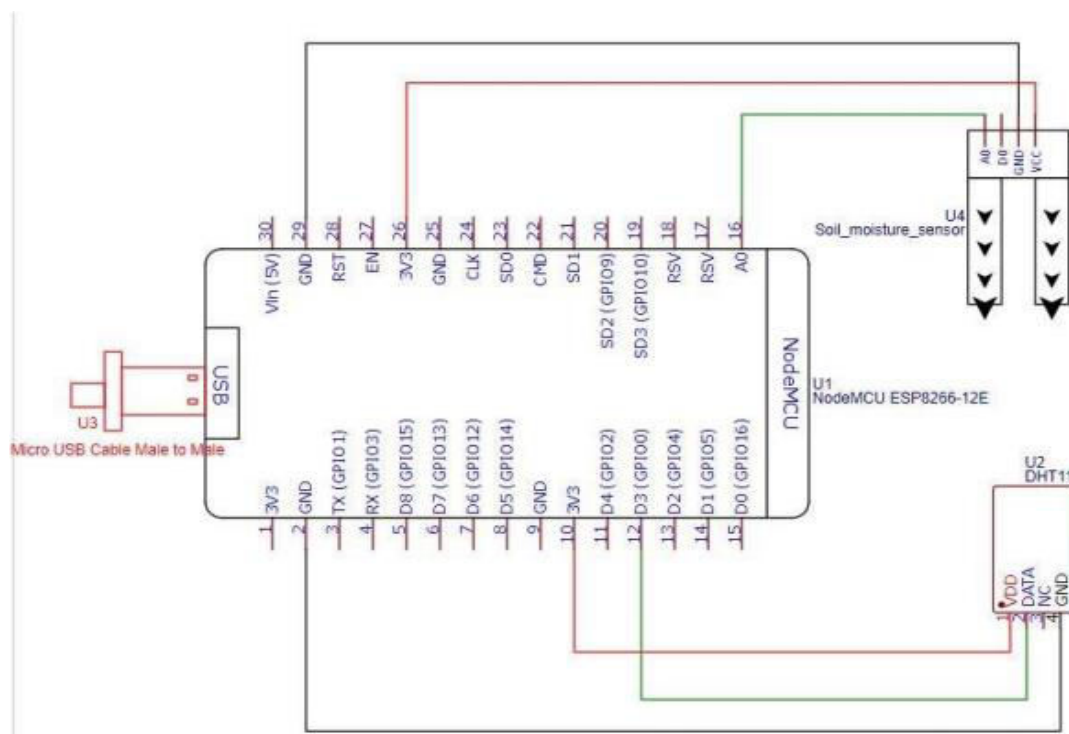


Figure 1: Circuit Diagram of the IoT System

Plant disease detection is a very important area of research that is being conducted in the field of machine vision. Machine vision equipment examines photos of plants that have been gathered to identify whether or not there is evidence of disease [4]. This is accomplished by taking photographs of the plants in question. Machine vision-based plant disease detection technology is currently utilised in agriculture, and it has mostly replaced the traditional method of identifying plant diseases by visually inspecting the plants with the naked eye. Classic computer vision algorithms or human feature design with classifiers are widely used in traditional machine vision-based plant disease detection methods [5]. [5] Traditional plant disease diagnosis methods rely on machine vision. This method builds the imaging scheme and determines a suitable light source and shooting angle based on the diverse characteristics of plant diseases, which helps to generate images with uniform illumination. Based on the characteristics of plant diseases, this method also helps to build the imaging scheme. While well-designed imaging schemes can make a significant dent in the difficulty of developing standard algorithms, the expense of actually putting such designs into practise goes up as a result.

Identification of plant diseases in genuine complex natural environments presents a number of challenges, such as a slight distinction between the lesion region and the backdrop, a lack of contrast, substantial variations in the size of the lesion area and different types, and a great deal of noise in the lesion image. In addition, a number of complications exist when photographing plant diseases using natural light as the source of illumination. The traditional, classical procedures often look ineffective at this time, and it is difficult to obtain improved detection results. The traditional technologies that are used to identify plant diseases have a number of shortcomings. In order to overcome this problem, we adapted our disease detection method to make use of a dataset that was found on Kaggle [9]. About 895 images are included in the collection, which is segmented into three categories: bacterial spot, healthy, and early blight. For training purposes, we make use of a pre-trained version of the model known as VGG16 [6], which is a convolutional neural network model (CNN) [7]. This model is what we load our dataset into, and then we utilise it to resize the photographs and split the dataset into test and training data.

716 photographs are taken from each session and used for training, while 179 images are taken from each class and used for assessment. After then, the training itself is prepared to be carried out on the model. The model has a validation loss of 0.4 and a validation accuracy of 0.6, while the output train loss is 0.22 and the train accuracy is 0.78. The validation accuracy of the model is 0.6. Following the completion of the training, the model is then saved in the currently active directory. Following this step, the model is incorporated into the primary code that is used for disease identification. The primary code is stored on the free tier of the Amazon Web Services (AWS) platform. The android application communicates with it through the use of the http protocols. The software will take a picture as input, convert it to the base64 format, and then send it to an Amazon Web Services server via a post request that encodes the URL. The sickness of the plant will reveal the solution. If there is no evidence of any illness, the response "healthy" will be provided. We are able to provide helpful recommendations for finding a solution to the issue at hand if the nature of the ailment can be established.

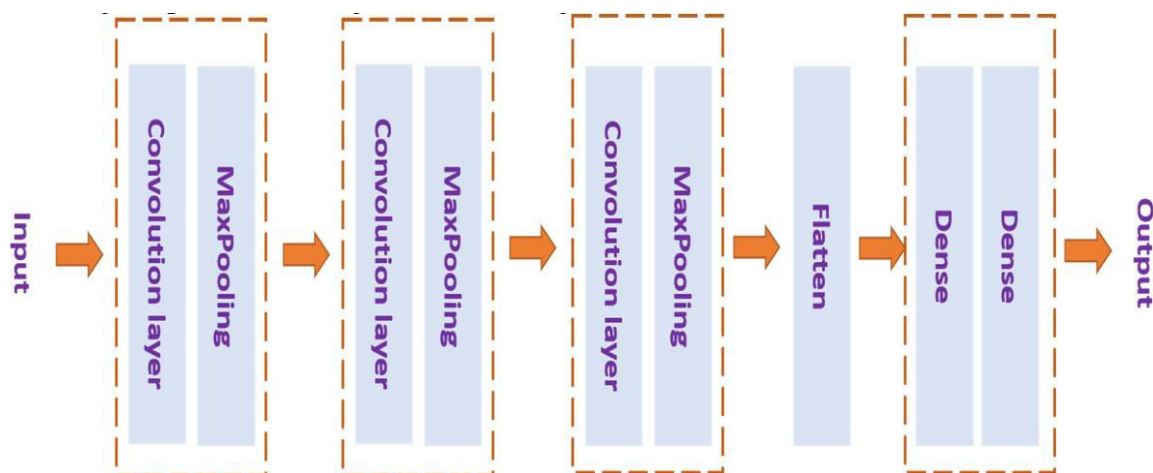
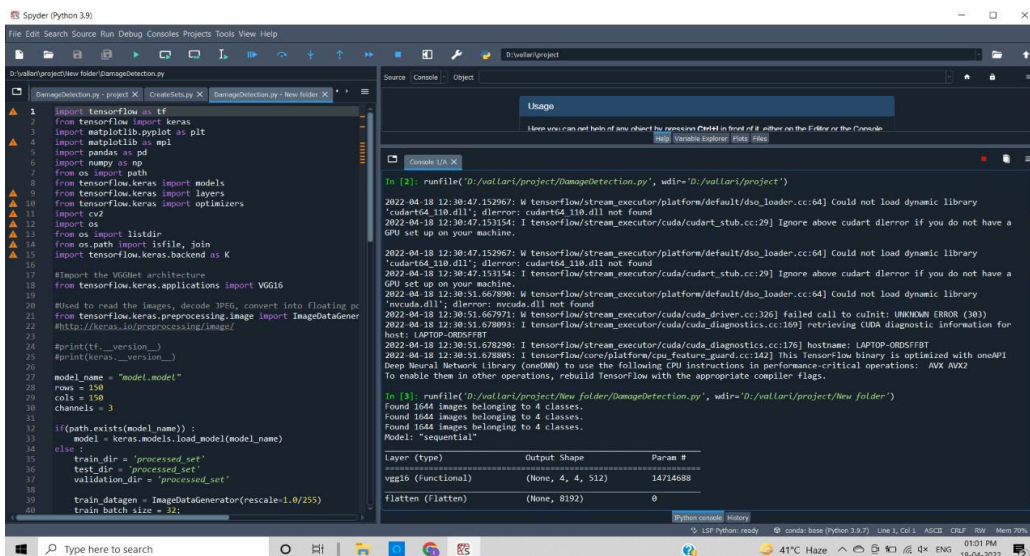


Fig. 2: Neural network model structure

CNN has a lot of advantages when it comes to picture feature extraction. CNN, like a biological neural network, minimizes the complexity of the network model and the number of weights by using a weight-sharing network topology. VGG16 has a deeper structure than LeNet, AlexNet, and ZFNet, and can extract features more effectively. The maximum pooling layer follows each of the five convolutions in the VGG structure [8].

IMPLEMENTATION

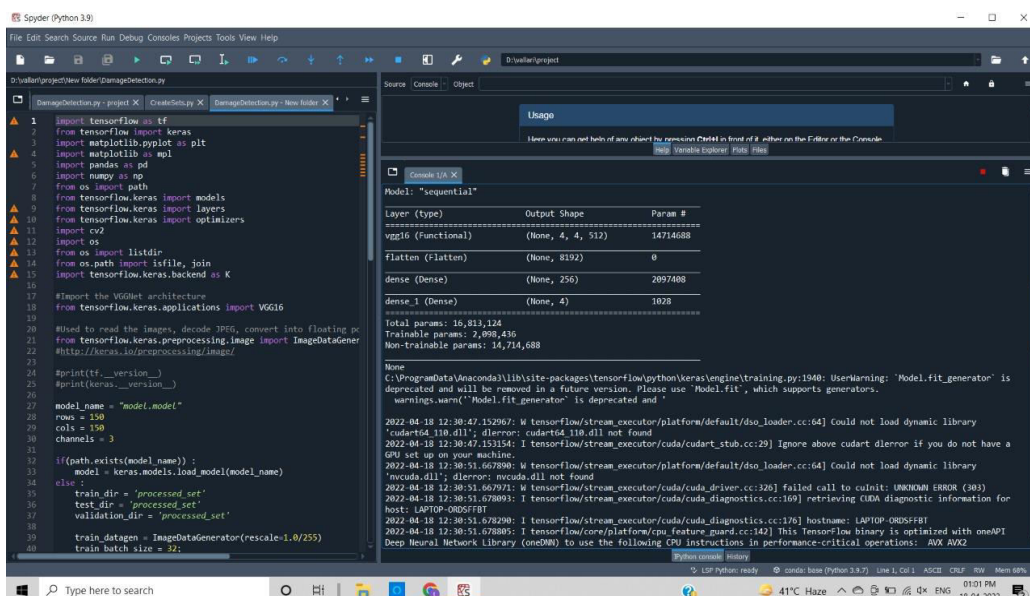


```
1 import tensorflow as tf
2 from tensorflow import keras
3 import matplotlib.pyplot as plt
4 import matplotlib as mpl
5 import pandas as pd
6 from os import path
7 from tensorflow.keras import models
8 from tensorflow.keras import layers
9 from tensorflow.keras import optimizers
10 import cv2
11 import os
12 from os import listdir
13 from os.path import isfile, join
14 import tensorflow.keras.backend as K
15
16 #Import the VGG16 architecture
17 from tensorflow.keras.applications import VGG16
18
19 #Used to read the images, decode JPEG, convert into floating po
20 from tensorflow.keras.preprocessing.image import ImageDataGener
21 #http://keras.io/preprocessing/image/
22
23 #print(tf.__version__)
24 #print(keras.__version__)
25
26 model_name = "model.model"
27 rows = 150
28 cols = 150
29 channels = 3
30
31 if (path.exists(model_name)):
32     model = keras.models.load_model(model_name)
33 else:
34     train_dir = "processed_set"
35     test_dir = "processed_set"
36     validation_dir = "processed_set"
37
38 train_datagen = ImageDataGenerator(rescale=1.0/255)
39
40 train_batch_size = 32;
```

Model: "sequential"

Layer (type)	Output Shape	Param #
vgg16 (Functional)	(None, 4, 4, 512)	14714688
Flatten (Flatten)	(None, 8192)	0
dense (Dense)	(None, 256)	2097408
dense_1 (Dense)	(None, 4)	1028

Figure 3: Coding Screen [A]



```
1 import tensorflow as tf
2 from tensorflow import keras
3 import matplotlib.pyplot as plt
4 import matplotlib as mpl
5 import pandas as pd
6 from os import path
7 from tensorflow.keras import models
8 from tensorflow.keras import layers
9 from tensorflow.keras import optimizers
10 import cv2
11 import os
12 from os import listdir
13 from os.path import isfile, join
14 import tensorflow.keras.backend as K
15
16 #Import the VGG16 architecture
17 from tensorflow.keras.applications import VGG16
18
19 #Used to read the images, decode JPEG, convert into floating poin
20 from tensorflow.keras.preprocessing.image import ImageDataGener
21 #http://keras.io/preprocessing/image/
22
23 #print(tf.__version__)
24 #print(keras.__version__)
25
26 model_name = "model.model"
27 rows = 150
28 cols = 150
29 channels = 3
30
31 if (path.exists(model_name)):
32     model = keras.models.load_model(model_name)
33 else:
34     train_dir = "processed_set"
35     test_dir = "processed_set"
36     validation_dir = "processed_set"
37
38 train_datagen = ImageDataGenerator(rescale=1.0/255)
39
40 train_batch_size = 32;
```

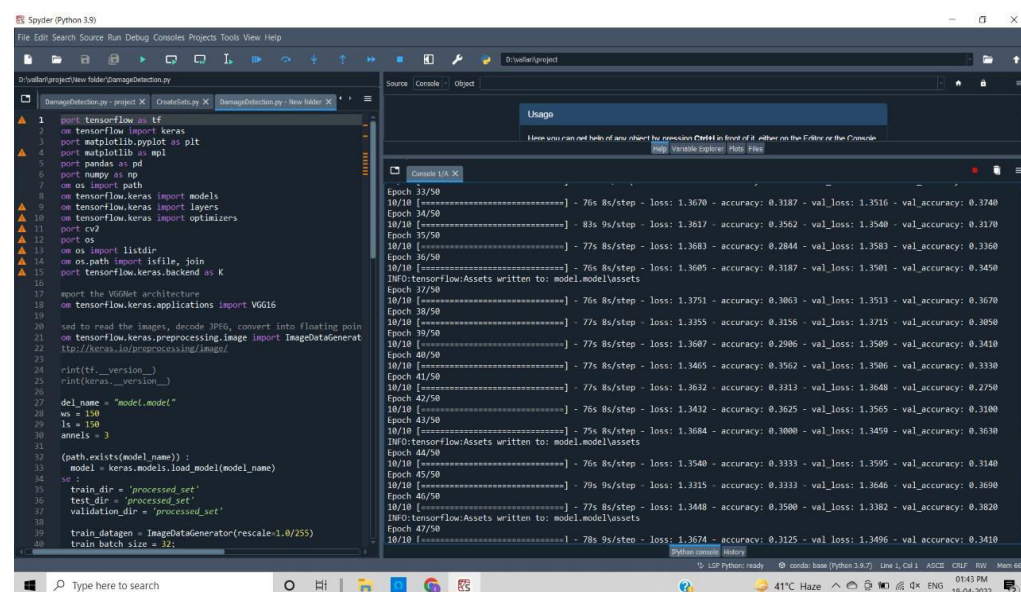
Model: "sequential"

Layer (type)	Output Shape	Param #
vgg16 (Functional)	(None, 4, 4, 512)	14714688
Flatten (Flatten)	(None, 8192)	0
dense (Dense)	(None, 256)	2097408
dense_1 (Dense)	(None, 4)	1028

Total params: 16,813,124
Trainable params: 2,098,436
Non-trainable params: 4,714,688

Warning: Model.fit_generator is deprecated and will be removed in a future version. Please use Model.fit, which supports generators.

Figure 4: Coding Screen [B]



```
1 import tensorflow as tf
2 from tensorflow import keras
3 import matplotlib.pyplot as plt
4 import matplotlib as mpl
5 import pandas as pd
6 from os import path
7 from tensorflow.keras import models
8 from tensorflow.keras import layers
9 from tensorflow.keras import optimizers
10 import cv2
11 import os
12 from os import listdir
13 from os.path import isfile, join
14 import tensorflow.keras.backend as K
15
16 #Import the VGG16 architecture
17 from tensorflow.keras.applications import VGG16
18
19 #Used to read the images, decode JPEG, convert into floating poin
20 from tensorflow.keras.preprocessing.image import ImageDataGener
21 #http://keras.io/preprocessing/image/
22
23 #print(tf.__version__)
24 #print(keras.__version__)
25
26 del_name = "model.model"
27 rows = 150
28 cols = 150
29 channels = 3
30
31 if (path.exists(model_name)):
32     model = keras.models.load_model(model_name)
33 else:
34     train_dir = "processed_set"
35     test_dir = "processed_set"
36     validation_dir = "processed_set"
37
38 train_datagen = ImageDataGenerator(rescale=1.0/255)
39
40 train_batch_size = 32;
```

Epoch 33/50 ----- 76s 8s/step - loss: 1.3670 - accuracy: 0.3187 - val_loss: 1.3516 - val_accuracy: 0.3740
Epoch 34/50 ----- 83s 9s/step - loss: 1.3617 - accuracy: 0.3562 - val_loss: 1.3540 - val_accuracy: 0.3170
Epoch 35/50 ----- 77s 8s/step - loss: 1.3683 - accuracy: 0.2844 - val_loss: 1.3583 - val_accuracy: 0.3360
Epoch 36/50 ----- 76s 8s/step - loss: 1.3605 - accuracy: 0.3187 - val_loss: 1.3501 - val_accuracy: 0.3450
INFO:tensorflow:Assets written to: model.model/assets
Epoch 37/50 ----- 76s 8s/step - loss: 1.3751 - accuracy: 0.3063 - val_loss: 1.3513 - val_accuracy: 0.3670
Epoch 38/50 ----- 77s 8s/step - loss: 1.3355 - accuracy: 0.3156 - val_loss: 1.3715 - val_accuracy: 0.3050
Epoch 39/50 ----- 77s 8s/step - loss: 1.3607 - accuracy: 0.2906 - val_loss: 1.3599 - val_accuracy: 0.3410
Epoch 40/50 ----- 77s 8s/step - loss: 1.3465 - accuracy: 0.3562 - val_loss: 1.3506 - val_accuracy: 0.3330
Epoch 41/50 ----- 77s 8s/step - loss: 1.3632 - accuracy: 0.3313 - val_loss: 1.3648 - val_accuracy: 0.2750
Epoch 42/50 ----- 76s 8s/step - loss: 1.3432 - accuracy: 0.3625 - val_loss: 1.3565 - val_accuracy: 0.3100
Epoch 43/50 ----- 77s 8s/step - loss: 1.3684 - accuracy: 0.3000 - val_loss: 1.3459 - val_accuracy: 0.3630
INFO:tensorflow:Assets written to: model.model/assets
Epoch 44/50 ----- 76s 8s/step - loss: 1.3540 - accuracy: 0.3333 - val_loss: 1.3595 - val_accuracy: 0.3140
Epoch 45/50 ----- 79s 9s/step - loss: 1.3315 - accuracy: 0.3333 - val_loss: 1.3646 - val_accuracy: 0.3690
Epoch 46/50 ----- 77s 8s/step - loss: 1.3448 - accuracy: 0.3500 - val_loss: 1.3382 - val_accuracy: 0.3820
INFO:tensorflow:Assets written to: model.model/assets
Epoch 47/50 ----- 78s 9s/step - loss: 1.3674 - accuracy: 0.3125 - val_loss: 1.3496 - val_accuracy: 0.3410
Epoch 48/50 -----

Figure 5: Data Processing

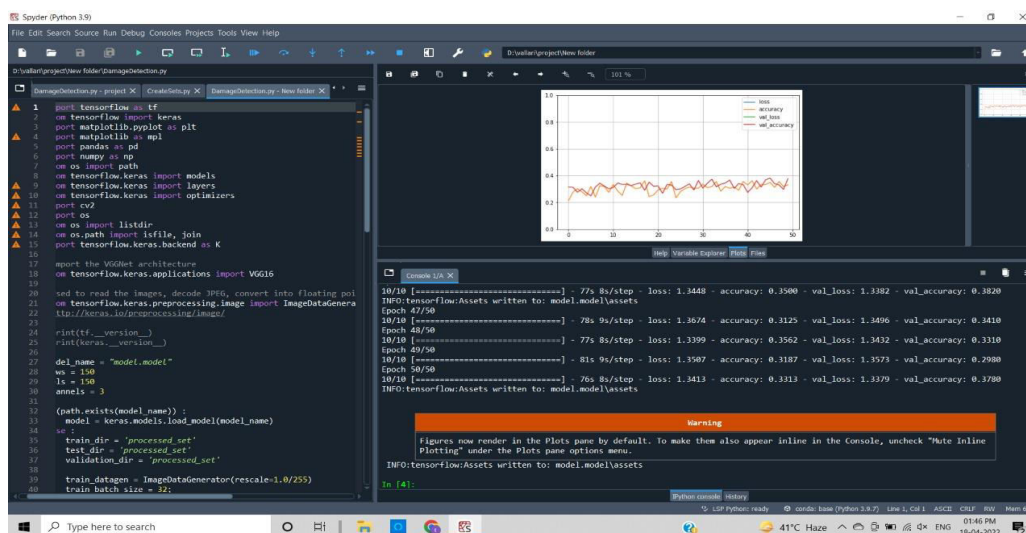


Figure 6: Graph Output

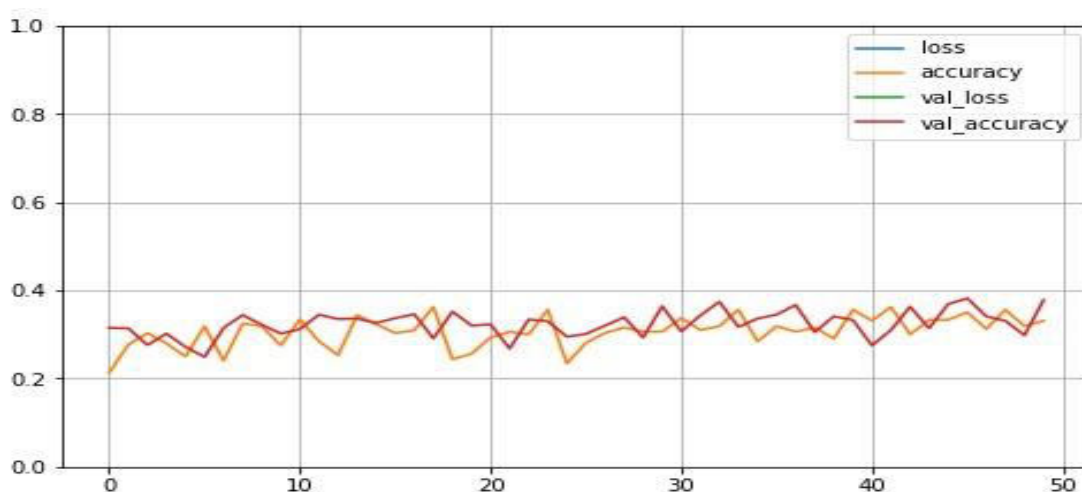


Figure 7: Graph Output for Showing the Percentage of Leaf Disease

RESULT ANALYSIS

The early detection and identification of plant diseases using deep-learning techniques has recently made tremendous progress. Identification using traditional approaches heavily *Electronics* **2021**, *10*, 1388 16 of 19 depends on some factors such as image enhancement, the segmentation of disease regions, and feature extraction.

Our approach is based on the identification of diseases using a deep-learning-based transfer-learning approach. Instead of using standard convolution, we used depthwise separable convolution in the inception block, which reduced the number of parameters by a large margin. To use both the inception and the residual network connection layer, we used the InceptionResNetV2 model. The model both has higher accuracy and requires less training time than the original architecture does, as the used parameters are much fewer. To check the performance towards a smartphone-implemented lightweight model to assist in plant-disease diagnosis, we implemented the MobileNetV2 model. We also implemented EfficientNetB0, which considers depth, width, and resolution during convolution. Although the convolutional-neural-network-based deep-learning architecture achieved high success rates in the detection of plant diseases, it has some limitations, and there is a scope for future works. A little noise in the sample images led to misclassification by the deep-learning model. Future work includes evaluating performance on noisy images and improving it. The dataset that we used to evaluate performance included 38 different diseases and healthy leaves. However, there is a need for the expansion of the dataset with wider land areas and more varieties of disease images. The dataset can also be improved with aerial photos, which are captured by drones. Another important issue is that the testing images are all from the same image dataset. Testing the network with real-time field images is an important challenging issue. The images that were used to test performance were all captured in laboratory conditions. The images that we used for testing our model are part of the same dataset, the training dataset. There is a need for the development of an efficient machine-learning system that could identify diseases in real-time scenarios and from collected data

from different datasets. Some researchers are working on this field; they tested their model with real-time images, and performance worsened by a huge margin around 25–30%. Mohanty et al. conducted an experiment where they tested their model with different images from those in the training dataset and achieved an accuracy rate of 31.5%. Ferentinos et al. Measured performance with training images in laboratory conditions and tested the images in real-time conditions, and achieved an accuracy rate of 33%. To improve this, we need wide variety in databases, for example, with images taken in different lighting conditions, from different geographical areas, and with cultivating conditions. In addition, we aim to carry this research forward by implementing it with a new deep-learning model, such as ACNet, and a transformer-based architecture, such as ViT and the MLP Mixer method, in plant disease identification, and evaluate its performance.

CONCLUSION

The Internet of Things (IoT) and machine learning are both topics that are investigated in this paper as they relate to smart farming technology. The use of this technology reduces the amount of manual labour that is required of farmers and growers, resulting in an increase in output in every conceivable way. For the purpose of achieving this goal, a comprehensive discussion is held on topics including machine learning techniques, modern communications, cloud computing, and wireless sensors. Tomato crop disease classification was achieved using pictures from the Kaggle dataset and the VGG16 pre-trained deep learning architecture.

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Quality Prediction of Water Using Machine Learning and IoT

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ABSTRACT

Water is one of the maximum important detail for the life of life. The protection and accessibility of drinking-water are principal worries at some stage in the globe. Health dangers might also additionally get up from intake of water infected with infectious agents, poisonous chemical substances etc. There are distinct parameters that may contaminate the water. These parameters are taken into consideration and used for predicting while to smooth the water. The machine makes use of technology including IoT and Machine Learning. It include the bodily and chemical sensor to degree pH, turbidity to test the parameters .The information acquired from the sensors are recorded and similarly dispatched for evaluation. The device set of rules is used for predicting the result. With the assist of evaluation made with the aid of using device mastering algorithms we can decide the exceptional of water accurately. This allows the person to recognize in advance approximately the exceptional of water of their residential tanks. This approach cannot simplest be constrained as much as residential tanks however also can be utilized in water remedy plant life and industries.

Index Terms: Machine learning, IOT, Quality prediction, sensors, water quality.

I. INTRODUCTION

Over the years, the quality of water and conservation is a major concern. Only 2% of freshwater (the water that we can actually use for drinking purposes resources are available on Earth that are due to human activities getting contaminated). The water that is contaminated not only looks bad or tastes bad but it is very dangerous for health. According to World Health Organisation, more than 30% of people are dying due to intake of contaminated or unsafe water. If we think about a personal basis so the first step could be to regularly check the water that is stored in the storage tank in our home or locality. This can be a very crucial step to prevent contamination of water. If we have the water quality or the water is getting contaminated or not information before so this will help us to avoid the results of drinking the contaminated water in humans especially. Now as from our system we are going to collect data then that data we are going to use for further analysis that is done through machine learning algorithms. We are having the standard values of non-contaminated water before. So now after getting the values by analysis, we are going to predict the water quality and how much now it is varying from an ideal dataset, how much the values are deviating, etc. Testing of water by traditional practice i.e by testing the water sample in the laboratory is very inefficient, time-consuming and not that accurate. And also due to the non-availability of modern techniques it always becomes very difficult to actually predict the water in time. In recent times computer technologies development has actually triggered the traditional practices. Internet of Things (IoT), it is one of the most modern and useful technologies that is used to connect the devices and sensors to the internet. IoT is the very great technological advancement in the network field which connects multiple devices with internet and can share the data with the user and for further analysis can use to predict results. These sensors are in continuously working state as with the help of them we can get data continuously. The IoT platform combines the collected data from various sources, with the help of various sensors, further analytics or further analysis is performed on the data and valuable information can be extracted as per the requirements.

II. LITERATURE SURVEY

Real Time Water Quality Monitoring System is the need of an hour. Working on water quality in drinking water or industrial waste water or contaminated water, there are many people that comes up with many concepts ,designs and models so that we all very soon will be in the stage where we propose the system which will be cost effective and giving high accuracy.

When we use IoT sensors so for coming into any conclusion first of all we need to test it in multiples water samples of every type from nearly uncontaminated to most contaminated one. Data collected is then compared with standard values or the values which is ideal.

The review article covers selected research journals published from 2014 to 2020. The findings from previous research indicate that despite the limitations of artificial neural network (ANN) tools, ANN has proved to be useful and powerful techniques that can be used in the field of hydrology. Similarly, ANN tools have the ability to evaluate historical data collected from different river stations and wastewater treatment plants with minimum

errors within a short time. Therefore, based on the selected past literature used for this review they found that different types of ANN algorithm such as feed-forward backpropagation (FFBP) algorithm, gradient descent, Broyden-Fletcher-Goldfarb-Shanno (BFGS), conjugate gradient, radial basis function neural networks (RBFNN), neural network fitting (NNF), cascade forward back propagation (CFBP), ensemble ANN (EANN) and single ANN (SANN) have been employed in the prediction and monitoring of water quality parameters with satisfactory outcome.

In, IOT based water quality has been projected. Real time water quality observation is monitored by data acquisition, method and transmission with increase in the wireless device network technology in internet of things. The measured values from the sensors are interfaced by microcontroller and the processed values remotely to the core controller ARM with a WI-FI protocol. This projected water quality observation interfaces sensors with quality observation with IOT setting. WQM selects parameters of water like temperature, pH level, water level and CO₂ by multiple different device nodes. This methodology sends the information to the web server. The data updated at intervals within the server may be retrieved or accessed from anyplace within the world. If the sensors do not work or get into abnormal conditions then a buzzer will be ON.

By monitoring the real-time sensor data indicators (such as indicators of temperature, pH, and turbidity) and forecasting them to get early warning, we can manage the quality of the water, thus collecting both quality and quantity in shrimp/fish raising. In this work, the authors have introduced an architecture with a forecasting model for the IoT systems to monitor water quality in aquaculture and fisheries. Since these indicators are collected every day, they become sequential/time series data, they propose to use deep learning with Long-Short Term Memory (LSTM) algorithm for forecasting these indicators.

In, in order to improve the accuracy of water quality prediction, an LSTM-BP combined model algorithm based on Long Short Term Memory Neural Network (LSTM NN) and BP neural network is proposed. Taking the water temperature data of No.6 large-scale integrated observation buoy on the Yangtze estuary as an example, a time series prediction model framework is established, and the data processing to model simulation is completed with the help of Python to realize the water quality prediction based on LSTM-BP. The method is compared with LSTM model and BP model, the experimental results show that the time series predicted by LSTM-BP is more accurate.

The aim in was to analyze and predict the quality of river water for daily usage and agricultural purpose. Taking advantage to the Gradient Boosting Model (GBM), the water quality was examined and forecasted. With the help of automatic water parameter measuring tools, samples were collected from numerous rivers of Bangladesh. The GBM was instructed utilizing the samples collected from year 2013 to 2019. The model functions using specified arguments. The model evaluates the water quality and anticipates the change that demonstrates the future water quality. The findings suggest that the model's expected values and actual values are in excellent agreement and the future change in water quality has been reported correctly.

In order to predict the variation trend of river pollutant concentration more accurately, based on CNN model and GRU network model, a CNN-GRU hybrid model is established to predict the concentration of river pollutants. Taking the pollutant concentration, river flow and river flow velocity as the input data of CNN model, the feature vector is extracted by CNN, and the high-dimensional vector of time series is constructed. Then, it is input into GRU for model training, and attention mechanism is used to optimize the model. Finally, pollutant concentration prediction is completed. At the same time, GRU model, BP neural network and ARIMA model are used to train and predict the same training set. The experimental results show that the prediction accuracy of CNN-GRU hybrid model is 3.15%, 4.72% and 10.81% higher than GRU model, BP neural network and ARIMA model, respectively.

In the authors studied five different ensemble machine learning (ML) models including Quantile regression forest (QRF), Random Forest (RF), radial support vector machine (SVM), Stochastic Gradient Boosting (GBM) and Gradient Boosting Machines (GBM_H2O) and were developed to predict the monthly biochemical oxygen demand (BOD) values of the Euphrates River, Iraq. For this aim, monthly average data of water temperature (T), Turbidity, pH, Electrical Conductivity (EC), Alkalinity (Alk), Calcium (Ca), chemical oxygen demand (COD), Sulfate (SO₄), total dissolved solids (TDS), total suspended solids (TSS), and BOD measured for ten years period were used in this study. The performances of these standalone models were compared with integrative models developed by coupling the applied ML models with two different feature extraction algorithms i.e., Genetic Algorithm (GA) and Principal Components Analysis (PCA). The reliability of the applied models was evaluated based on the statistical performance criteria of determination coefficient (R²), root mean square error (RMSE), mean absolute error (MAE), Nash-Sutcliffe model efficiency coefficient

(NSE), Willmott index (d), and percent bias (PBIAS). Results showed that among the developed models, QRF model attained the superior performance. The performance of the evaluated models presented in this study proved that the developed integrative PCA-QRF model presented much better performance compared with the standalone ones and with those integrated with GA. The statistical criteria of R^2 , RMSE, MAE, NSE, d, and PBIAS of PCA-QRF were 0.94, 0.12, 0.05, 0.93, 0.98, and 0.3, respectively.

With advancement in ICT, tools and techniques can be developed that can help in analyzing and automating various phases of farming for improving productivity. This work focuses on analyzing the quality of irrigation water and developing a model for prediction of Irrigation Water Quality Index (IWQI) based on Salinity and Solidity. Development of IWQI can save time and cost of lab tests for irrigation water. Five parameters of water Na^+ , Cl^- , EC, HCO_3^- and SAR are measured using which the IWQI is calculated. These five parameters are further reduced to three parameters using correlation analysis and a classification model for prediction of water quality class is developed using various classification techniques. Best result is obtained by Random Forest Classifier followed by Gradient Boosting and Neural Network Classifier.

To resolve concerns on intrusion detection various machine learning algorithms for classification are there but choosing the best one is an important task. The authors conducted an experimental study on machine learning algorithms and analyzed the performance of the famous classification algorithms in the literature namely Decision Tree and Support Vector Machines using a real dataset retrieved from a Tunisian water treatment station.

III. PROPOSED WORK

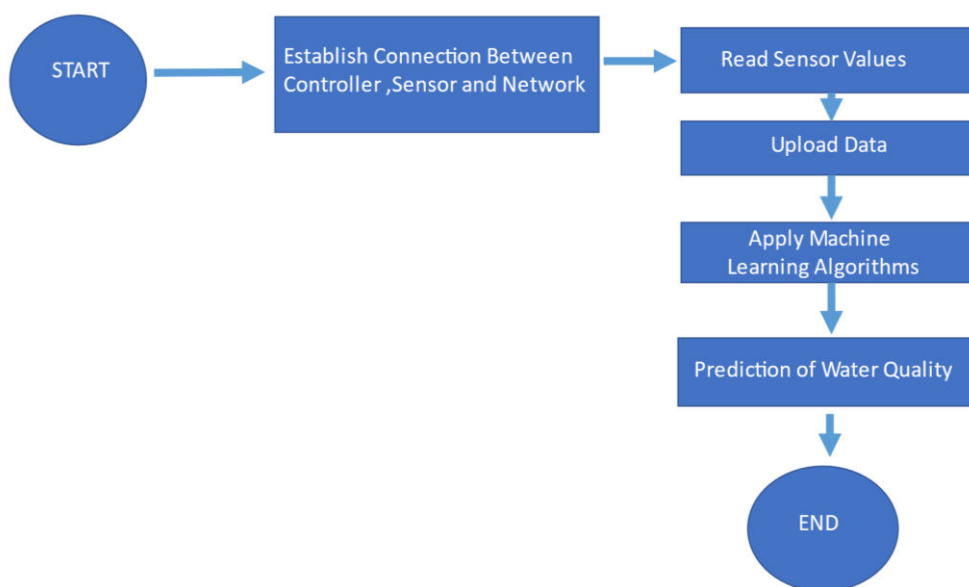


Fig 3.1: Explaining the flow of the system

There are Three Modules in This Project,

1. **Sensing Module:** In this module, we are going to take values from all sensors i.e. pH and turbidity sensors with the help of Arduino UNO and then display them in Arduino IDE
2. **Data Processing Module:** In this module we are going to save the data which we get from the sensors in arduino cloud storage.
3. **Analysis Module:** In this module we are going to do analysis on the data we get by using Machine Learning Algorithms.

3. A REQUIRMENTS

The IoT components used in this project are:

- 1) **pH Sensor:** A pH is an electronic device which is used for measuring the pH level in water. It consists of three types of probes (i) Glass electrode (ii) Reference electrode (iii) combination of gel electrode. pH is defined as the negative logarithm of hydrogen ion concentration in water.

$$pH = -\log[H^+]$$

A pH meter consists of special probes which are connected to an electronic meter that would display the reading. If the pH level is less than 7 then it is acidic in nature, if the pH level is greater than 7 then it is alkaline in nature, and generally the range of pH is 0-14pH.



Fig 3.2: pH Sensor

Features

- a) Operating range: 0-14
- b) Operating temperature: 0-45 degree C
- c) Operating voltage: -5 to 5 v
- d) Output voltage: analog

2) **Turbidity Sensor:** This is a Turbidity Sensor with Module, an electronic monitoring module specially developed to work with microcontroller platforms Arduino, Raspberry Pi, PIC, ARM, AVR, among others. It is very efficient. The Arduino Turbidity Sensor is able to detect and verify the quality of the water, making the turbidity measurement, where it is possible to verify the results by means of digital or analog signal next to the corresponding pins in the accompanying electronic module.

The Turbidity Sensor emits at its end an infrared light, imperceptible to human vision, capable of detecting particles that are suspended in water, measuring the light transmittance and the dispersion rate, which changes according to the Amount of TSS (Total Suspended Solids), increasing the turbidity of the liquid whenever levels increase.

In general, the Arduino Turbidity Sensor is applied in projects involving the monitoring of water turbidity in rivers, streams, lakes, water bodies, catchment and research sites, laboratories, tanks with liquids, and so on. This Turbidity Sensor has an end specially prepared for direct contact, having an electronic module to amplify and send the received data to the microcontroller of the project.



Fig 3.3: Turbidity Sensor

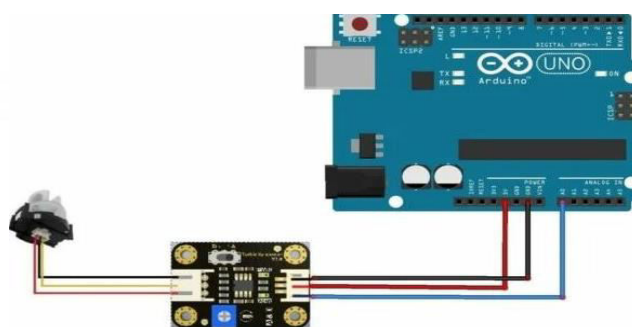


Fig 3.4: Interfacing Turbidity Sensor with Arduino

Features:

- a) Operating Voltage: 5VDC.
- b) Current: 30mA (MAX).
- c) Operating temperature: -30 ° C to 80 ° C.
- d) Compatible with Arduino, Raspberry Pi, AVR, PIC, etc.
- e) Measuring Range: 0 ~ 1000 NTU.

3) **Arduino UNO:** This **Arduino Uno** is an original microcontroller board from **Arduino** officials based on the **ATmega328P**. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains

everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

“Uno” means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Original Arduino Uno Rev3 board is the first in a series of USB Arduino boards and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.



FIG 3.5: Arduino UNO

Features

- a) Manufacturer: Arduino Officials
- b) Micro- controller: ATmega328P.
- c) Operating Voltage: 5V.
- d) Input Voltage (recommended): 7-12V.
- e) Digital I/O Pins: 14 (of which 6 provide PWM output).
- f) Analog Input Pins: 6.

WI-FI Module: The Arduino Uno WiFi is an Arduino Uno with an integrated WiFi module. The board is based on the ATmega328P with an ESP8266WiFi Module integrated. The ESP8266WiFi Module is a self contained SoC with integrated TCP/IP protocol stack that can give access to your WiFi network (or the device can act as an access point). One useful feature of Uno WiFi is support for OTA (over-the-air) programming, either for transfer of Arduino sketches or WiFi firmware. The Arduino Uno WiFi is programmed using the Arduino Software (IDE), our Integrated Development Environment common to all our boards and running both online and offline.

The implementation of this process is as follows:

The proposed system consists of number of wireless sensors which are pH sensor and Turbidity sensor, which are connected to the NodeMCU controller. The sensors continuously transmit the data to the controller. The data is collected in the database and the result is sent to machine learning algorithm to analyze the data over the monthly basis.

3. B HARDWARE IMPLEMENTATION

The system consists of a microcontroller named as NodeMCU. It is inexpensive controller. It has the Wi-Fi module to easily connect with the user and share the predicted result. In the proposed system, the pH sensor and the Turbidity sensor are connected to NodeMCU. These sensors collect the data from the water and data is collected and stored into cloud server and the database is sent for predicting the values and their analysis. The data collected is further used for predicting the quality of water in advance using the machine learning algorithm.

1) Component Setup

The pH sensor, the Turbidity sensor, the NodeMCU and the LED plate are connected to the Arduino UNO microcontroller via wires on the White breadboard. The microcontroller is connected to a 5V battery for power supply. The whole setup is then connected to our operating system. In this way the component setup is made up for the hardware implementation. The LED plate displays the readings of the sensors when they are dipped in the water.

2) Readings of Water Sample

Firstly, the water sample is taken and sensors are dipped inside the water sample. The pH and Turbidity sensors are together put inside the water. The readings of the sensor are shown on the LED plate.

3) Data Generation and Database on Cloud

Likewise we take many readings by the sensors when we run our program for sensor value generation. These values are then stored into CSV format on the Heroku Cloud server. Via this server our data is used for further processing.

3. C SOFTWARE IMPLEMENTATION

The software used for implementation is Jupyter Notebook in which machine learning algorithm was used. The machine learning algorithm which we is being used in this project is the Random Forest of Scikit-Learn library for classification.

Firstly, we are describing the data what we have received from sensors and controllers. Here we are doing the analysis of our data which contains columns of pH and Turbidity.

We have used data visualization tools such as Seaborn, Matplotlib of python and Plotly charts.

Here the charts describe the pH and Turbidity individually of water which we have obtained of the water samples on the database made.

Following are the steps involved in prediction of the water sample readings obtained from the sensors.

1) Data Exploration and Preprocessing

We load all the libraries and modules required for the predictive analysis of the water quality samples. We have loaded the dataset which have all the readings collected by the sensors and microcontrollers and saved into a .csv file for creating the database.

By removing all the readings with null values, we have cleaned the unwanted data and all of them are dropped from the dataframe with corresponding rows. Then we have created graphs and plots with respect to the data. These are histogram on individual columns, correlation on the data. Seaborn plots for the data and individual columns, etc.

Here, there is a classification model built basically Random Forest classifier and the classifier is dumped into sav file.

2) Deployment

A file is created for the web application which is a .py file which is used for deployment via Github on the Streamlit platform. The app is deployed on this platform and then a User interface is made automatically via this app. Our data is loaded in this app and we can view it in a tabular form. Below that, in this app, we have created Plotly chart options for individual pH and Turbidity values. These charts are Line chart, Histogram and Area chart respectively. A sidebar is created on the left side of the app where are prediction is carried out. The dataset is loaded via the Heroku cloud server. The classifier used for prediction which is of the Random Forest algorithm is loaded in the app code.

3) Mean of Sensor Readings and Predictive Analysis

Mean value of both the columns are displayed on the sidebar. On these values, prediction is done if the water is potable for future use. pH is distinguished between neutral, acidic and basic. Turbidity is distinguished into above range, medium and good for drinking water. Potability of water samples for future use is calculated on the basis of ph and turbidity values.

Our classifier Random Forest (RT) is used to carry out prediction of the dataset for future water quality.

3. RESULTS

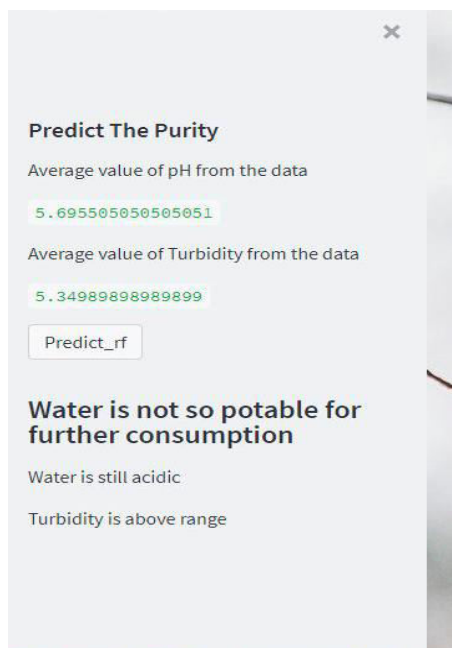


Fig 3.6: Prediction of values

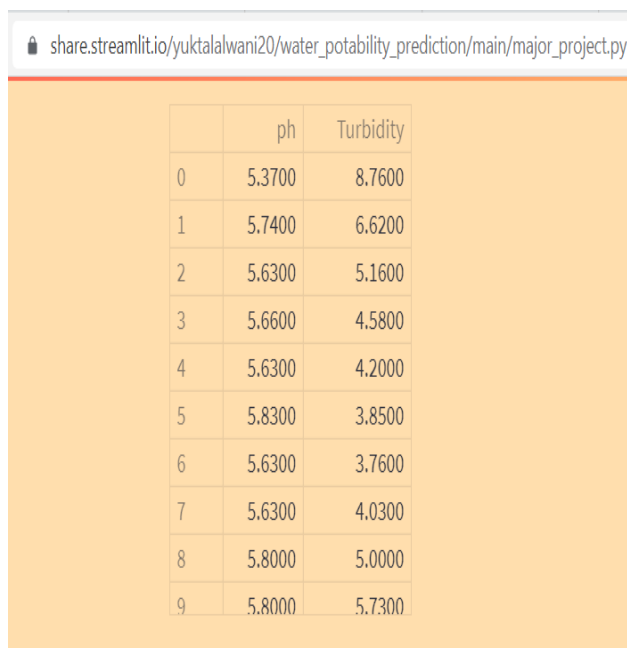


Fig 3.7: Values from the sensors

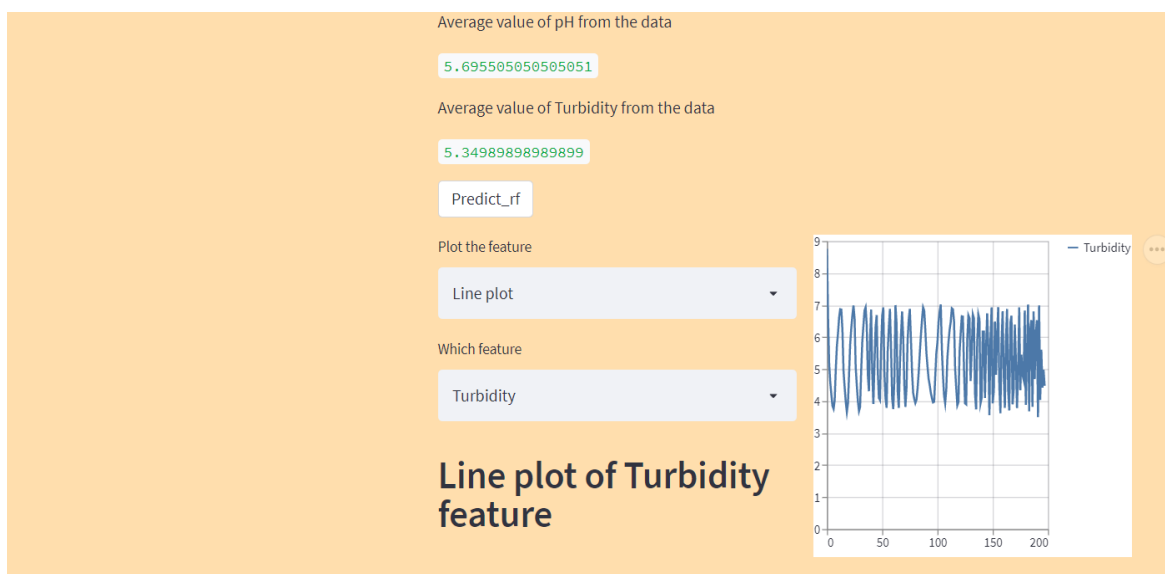


Fig 3.8: Line plotting from the values given by the sensors

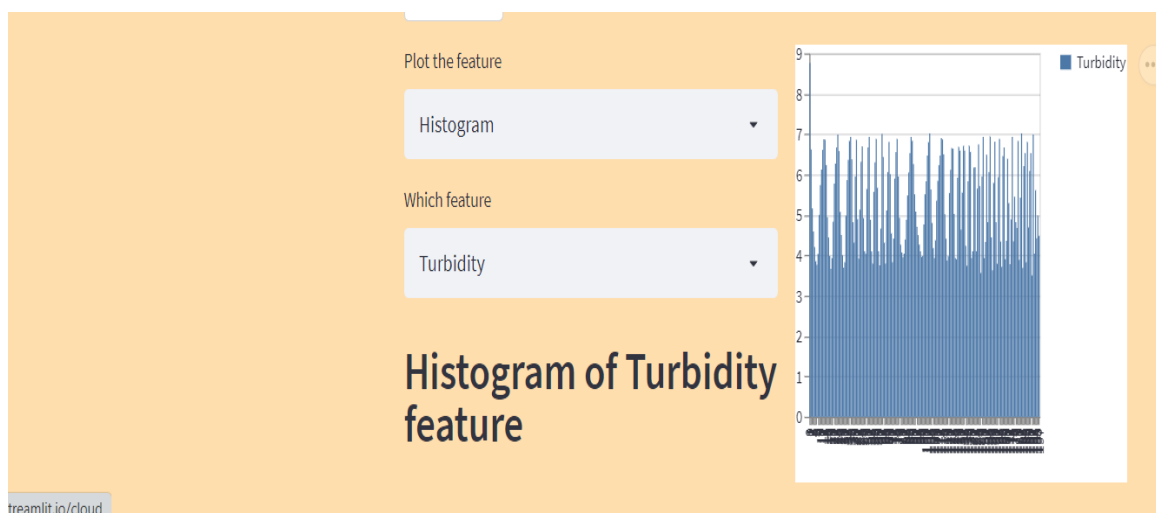


Fig 3.9: Histogram from the values given by the sensors

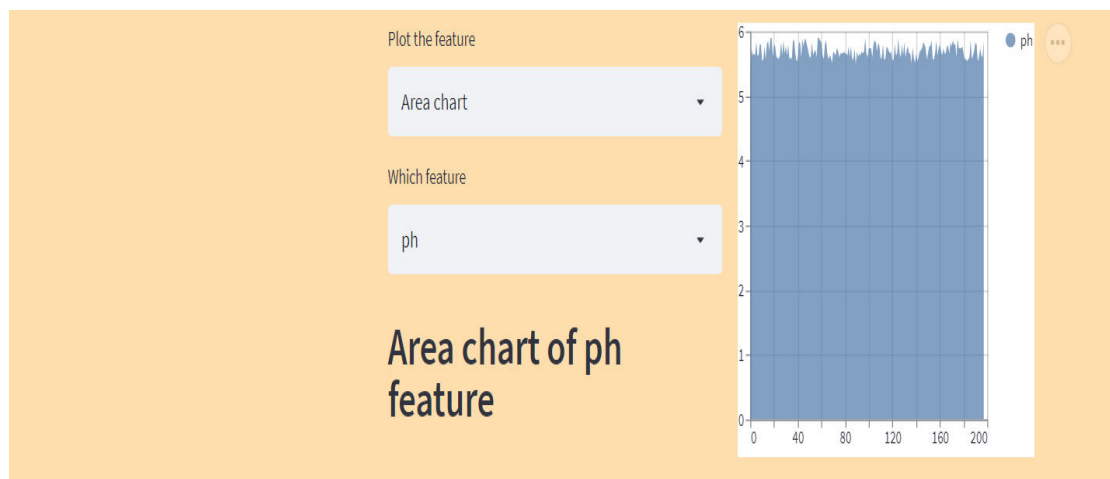


Fig 3.10: Area chart from the values given by the sensors

We have carried out predictions on models built for potability and detecting quality of the water samples for how long the water will be potable for consumption or for drinking purposes. We have come up with the best potability results with this algorithm. If the prediction value is equal to 1, the water is good for further usage. If the prediction value is equal to 0, then it is not good for further use. The water is in good range of consumption or not is stated below in the sidebar.

Hence we have predicted that the water sample is almost potable for further drinking purposes and the quality of water is also good for future uses if it stands long for a long period of time.

IV. FUTURE SCOPE

The quality of water is monitored using IoT devices i.e. through Arduino UNO, pH and turbidity sensor and the prediction of water quality is done using a machine learning algorithm. The proposed system consists of multiple sensors connected to Arduino UNO and NodeMCU WIFI-ESP32 to collect the value of various water parameters. It is cost-effective and accurate too. The future scope for this project is to find out about the diseases caused by different parameters and finding the appropriate solution to clean the water and making it contamination-free. Also for detection, the macrobacteria biosensors can be used which will ultimately lead to better quality of water.

V. CONCLUSION

Water quality prediction using traditional techniques requires more time, more cost for components, more people and most importantly less accuracy. With the help of modern technologies it becomes easier and more accurate. With the use of IoT sensors that give accurate results it becomes easy to actually understand all important parameters for water quality prediction and then use this value with the machine learning algorithm(s) to predict more accurately about water purity, contamination, potability, etc.

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Synthesis, Characterization and Antimicrobial Activity of Some Novel 1-Cyclopropyl-6-Fluoro-8-Methoxy-7-Substituted-4-Oxo-1, 4- Dihydroquinolin-3-Carboxylic Acids

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ABSTRACT

A novel series of 1-cyclopropyl-6-fluoro-8-methoxy-7 substituted-4-oxo-1,4-dihydroquinolin-3-carboxylic acids 3a-i are obtained by the reaction between Ethyl-1-cyclopropyl-6,7-difluoro-8-methoxy-4-oxo-1,4-dihydroquinoline-3-carboxylate (1) and nitrogen-containing heterocycles such as 2,3-dichloro phenyl piperazine hydrochloride, 3-(piperidin-4-yl)benzo[d]isoxazole hydrochloride, 5, 6, 7, 8-tetrahydro-[1, 2, 4]-triazolo[4, 3-a]-pyrazine 2(a-i) in the presence of triethylamine refluxed at 90-95 °C for 5hr conventionally moderate yields, whereas in the case of triethylamine adsorbed on alumina and transferred into a microwave vial, was subjected to microwave irradiation of 300 Watt at 100°C for 10 min to give 85-92% yield. The synthesized composites and reference medicines are tested in vitro against colorful strains of bacteria *E. coli* ATCC 25922, *B. subtilis* ATCC 1633, *S. aureus* ATCC 25923, and thus the fungi *C. albicans* ATCC 2091, *A. niger* ATCC 9029 and *C. krusei* ATCC 6258. Microbiological results showed that the synthesized composites held a broad diapason of antimicrobial exertion against the microorganisms tested. 1-Cyclopropyl-7- (-dihydro- (d)-triazolo (-a)-pyrazin-7 (8H)-yl) acid 3i has flashed stronger antibacterial exertion as compared to plain medicine, chloramphenicol and remainder of the composites of this series and has also showed significant antifungal activity as assimilated to the grade medicine, fluconazole.

Keywords: Quinoline, microwave, antibacterial activity, antifungal activity

INTRODUCTION

Heterocycles comprising a nitrogen atom have interesting medicinal and pharmaceutical properties^{1,2}. Among them, quinoline derivatives are exceptional nitrogen-containing heterocycles that concerned specific attention to having a superior place as building blocks of a variety of pharmaceutical agents, natural products, and biological active molecules³⁻⁵.

Nalidixic acid is the oldest member of the quinolone class of synthetic antimicrobial agents⁶, and has been used for the treatment of urinary tract infections for many years. This drug is of relatively minor significance, due to its limited therapeutic utility and the rapid development of bacterial resistance. Against this background, fluorinated 4-quinolones like norfloxacin, ciprofloxacin, ofloxacin, etc., were developed. Since these agents have a broad antimicrobial profile, they are effective after oral administration to treat a wide variety of infectious diseases^{7,8}. However, serious side effects are associated with these drugs along with the development of antimicrobial resistance. Remarkably, an extensive literature survey has been carried out, which has indicated that derivatives of quinoline⁹⁻¹¹ exhibit a good antimicrobial profile. In recent years, the expansion of antimicrobial agents becomes one of the leading areas of antibacterial research, because of their resistance to the existing antibacterial and antifungal drugs¹²⁻¹⁴. This is the area why it seems crucial to examine novel antimicrobial molecules with new mechanisms of action, to overcome antimicrobial resistance.

Green chemistry is playing a major role in industries to reduce waste generation to make the environment friendly and by a simple way to reach the target. Specifically, microwave emanation is an energy source of which the notoriety and faux mileage in organic chemistry has escalated monstrously in recent times for lead substantiation as well as legitimization onrushes of makeshift organic shrimp molecules.¹⁵ The galloping searing invoked by such radiation weasels the grievous conditions and reagent putrefaction of classical methods, disrates reaction time¹⁶, stellar to the embodiment of products under placid reaction conditions and ordinarily with sky-high yields.^{17,18}

The increasing incidence of bacterial and fungal resistance to a large number of antimicrobial agents has prompted studies on the development of new potential antimicrobial compounds. Hence, in this work, an attempt was made to synthesize and evaluate the biological activities of novel 1-cyclopropyl-6-fluoro-8-methoxy-7-substituted-4-oxo-1,4-dihydroquinolin-3-carboxylic acids.

Experimental Section

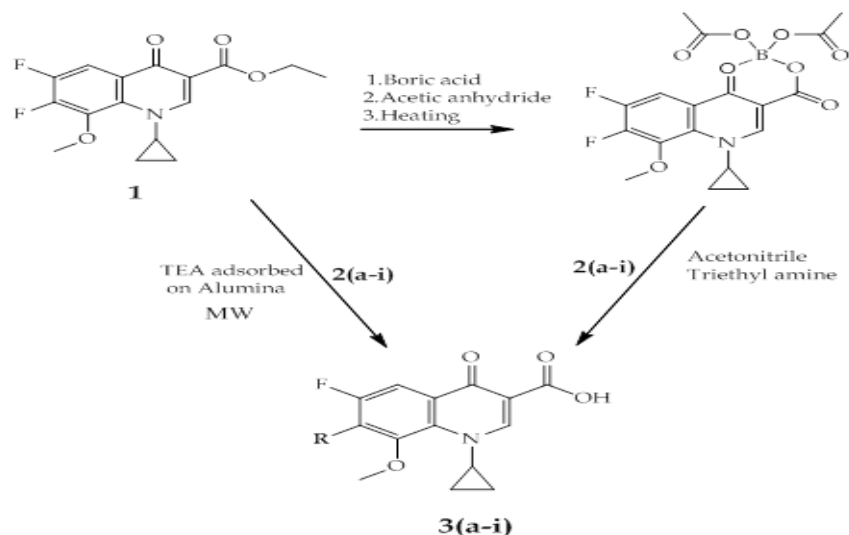
Melting points were determined using a Cintex melting point apparatus and are uncorrected. Thin-layer chromatography (TLC) was performed by using Merck silica gel 60F254 pre-coated plates (0.25 mm) and column chromatography was performed by using Silica gel (particle size 100-200 mesh). IR spectra (KBr) were recorded on a Bruker WM-4(X) spectrophotometer (Model 577). Proton nuclear Magnetic Resonance (300 MHz) and Carbon Nuclear Magnetic Resonance (75 MHz) spectrums were logged on Bruker AC-300 spectrophotometer in DMSO-d₆ with TMS as reference. Mass spectrum was documented on JEOL SX-102 spectrophotometer. All the chemicals and reagents used in present investigation were purchased from Sigma Aldrich Chemical Company.

RESULTS AND DISCUSSIONS

Chemistry

At the outset, a solution of ethyl-1-cyclopropyl-6,7-difluoro-8-methoxy-4-oxo-1,4-dihydroquinolin-3-carboxylate (**1**) and acetic anhydride were refluxed at 90-95°C. After 2 h reaction mixture, the temperature was reduced to 50-55 °C then; boric acid was added in three lots with 1h time interval for each lot and again heated to reflux at 110-115°C for the specified time. The resultant borate complex was immediately dissolved in acetonitrile and added various heterocycles {morpholine, piperidine, thiomorpholine, 2,6-dimethylmorpholine, 2,4,5,6,7,7a-hexahydrothieno[3,2-c]pyridine hydrochloride, 5,6,7,7a-tetrahydrothieno[3,2-c]pyridin-2-(4H)-one hydrochloride, 1-(2,3-dichlorophenyl)piperazine hydrochloride, 3-(piperidin-4-yl)benzo[d]isoxazole hydrochloride, 5,6,7,8-tetrahydro[1,2,4]-triazolo[4,3-a] pyrazine 2(a-i)} followed by triethylamine at RT to obtain the corresponding products **3 (a-i)**.

Later, the compound ethyl-1-cyclopropyl-6,7-difluoro-8-methoxy-4-oxo-1,4-dihydroquinoline-3-carboxylate (**1**) was treated with different nitrogen-containing heterocycles like Morpholine, Piperidine, Thiomorpholine, 2,6-dimethylmorpholine, 2,4,5,6,7,7a-hexahydrothieno[3,2-c]pyridine hydrochloride, 5,6,7,7a-tetrahydrothieno[3,2-c]pyridin-2(4H)-one hydrochloride, 2,3-dichloro phenyl piperazine hydrochloride, 3-(piperidin-4-yl)benzo[d] isoxazole hydrochloride, 5,6,7,8-tetrahydro-[1,2,4]-triazolo[4,3-a]-pyrazine **2(a-i)** in the presence of triethylamine adsorbed on alumina and transferred into a microwave vial. The vial is sealed with caps and vials under microwave irradiation at 300 Watts for 10 min to afford compounds **3(a-i)**. (Scheme I).



Scheme I

R=a 	b 	c 	d 	e
f 	g 	h 	i 	

Antibacterial Activity

Then the compounds **3a-i** and standard drug chloramphenicol were screened for their antibacterial activity against *E. coli* ATCC 25922, *B. subtilis* ATCC 1633 and *S. aureus* ATCC 25923. These compounds displayed varying degrees of antibacterial activity (**Table II**). Among all, the compound **3i** revealed maximal inhibition with MIC 3.125-6.25 $\mu\text{g/mL}$ against bacterial strains used when compared to the standard drug. As well, the compounds **3h** and **3i** exhibited prominent antibacterial activity, while rest of the compounds investigated in the present study have not shown significant activity.

Antifungal Activity

Later, the antifungal activity of the compounds **3a-i** along with reference drug fluconazole was also carried out against *C. albicans* ATCC 2091, *A. niger* ATCC 9029 and *C. krusei* ATCC 6258 at a concentration of 250 $\mu\text{g/mL}$ and the results are shown in **Table II**. It has been that the compound **3i** has displayed potential antifungal activity against the above strains with MIC 3.125, 12.5 and 1.592 $\mu\text{g/mL}$, respectively, as compared to fluconazole. On the other aspect, the compounds **3a**, **3b** and **3d** have shown not affected the growth of fungal strains. Besides, the compounds **3e**, **3f** and **3h** have shown mild to significant antifungal activity (**Table II**).

General procedure for the synthesis of 1-cyclopropyl-6-fluoro-8-methoxy-7 substituted-4-oxo-1,4-dihydroquinolin-3-carboxylic acids **3(a-i)**

Conventional Method

A mixture of ethyl (**1**) (100g, 309.31 mmol) and anhydride (200 mL) was refluxed at 90-95 °C for 2h. Then, the temperature was reduced to 50-55 °C. At this temperature, boric acid (27.2 g, 439.91 mmol) was added in three lots with 1h interval for every lot and again heated to reflux at 110-115 °C for a specified time. The completion of the response was monitored by thin subcaste chromatography; the admixture was cooled to 0-5 °C and quenched with 100 ml of ice-cooled water. The obtained solid was filtered, washed with cold water (100 mL), and dried inside a chamber for 10-15 h to get a continuing weight. The attendant borate complex (5.0 g, 11.08 mmol) was incontinently dissolved in acetonitrile detergent (50 mL) and added with heterocycles { morpholine, piperidine, thiomorpholine, 2, 6-dimethylmorpholine, 2, 4, 5, 6, 7, 7a-hexahydrothieno (-c) pyridine hydrochloride, 5, 6,-tetrahydrothieno (-c) pyridin-2- (4H)-one hydrochloride, -dichlorophenyl piperazine hydrochloride, 3- (piperidin-4-yl) benzo (d) isoxazole hydrochloride, -tetrahydro-triazolo (-a) pyrazine **2(a-i)** (11.08 mmol)} followed by triethylamine (2.242 g, 22.16 mmol) at 27 °C. Also, sluggishly raised the temperature to 60-65 °C, continuing for 3 hours. Progress of the response was observed by thin subcaste chromatography. After completion of the response, the admixture was cooled and quenched with ice-cold water and adapted the pH to 2.0 with a dilute acid result. The drawn solid product was filtered, washed with water, and dried. The consequent crude is purified by a crystallization method using methanol as solvent **3(a-i)** (**Table I**).

Microwave Method

Ethyl-1-cyclopropyl-6,7-difluoro-8-methoxy-4-oxo-1,4-dihydroquinoline-3-carboxylate (**1**) (5g, 17.6 mmol) was treated with nitrogen-containing heterocycles like Morpholine, Piperidine, Thiomorpholine, 2, 6-dimethylmorpholine, 2,4,5,6,7, 7a-hexahydrothieno[3, 2-c]pyridine hydrochloride, 5, 6, 7, 7a-tetrahydrothieno-[3,2-c]pyridin-2(4H)-one hydrochloride, 2, 3-dichloro phenyl piperazine hydrochloride, 3-(piperidin-4-yl)benzo[d]isoxazole hydrochloride, 5, 6, 7, 8-tetrahydro-[1, 2, 4]-triazolo[4, 3-a]-pyrazine **2(a-i)** (21.2 mmol) in the presence of triethylamine adsorbed on alumina (10 mol%) and transferred into a microwave vial. The vial sealed with caps and vials was subjected to microwave irradiation (300 Watt) at 100°C for 10 min. The obtained crude was purified by silica gel column chromatography (eluted with methanol and methylene dichloride (9:1 ratio)) to furnish pure compounds **3(a-i)** (**Table I**). The structures of the synthesized compounds **3(a-i)** have been confirmed by using advanced techniques like IR, ¹H NMR, ¹³C NMR and mass spectral data.

The IR spectra show absorption frequency bands within the series of 3452-3375 cm^{-1} for the hydroxyl group in carboxylic acids. A more intense peak appeared in the range of 1298-1054 cm^{-1} for C-O stretching modes and 1780-1610 cm^{-1} for carbonyl groups present in the quinolone ring and substituted heterocyclic moieties which confirmed the structure.

Besides, the compound structures were confirmed by ¹H NMR spectral data. A multiplet appeared at δ 1.15-1.05 ppm, due to the presence of four hydrogens (2X-CH₂) for the cyclopropyl group and a multiplet peak appeared at δ 4.44-4.15 ppm, due to the presence of -CH of cyclopropyl ring. At a range of δ 3.67-3.82 ppm, singlet was observed for -OCH₃ protons for the compounds of **3(a-i)**, and an olefinic proton was obtained at δ 8.696-9.08 ppm, the acidic proton appeared as a singlet at δ 14.93- 15.00 ppm.

1-Cyclopropyl-6-fluoro-8-methoxy-7-morpholino-4-oxo-1,4-dihydroquinoline-3-carboxylic acid (3a): ¹H NMR (300 MHz) (DMSO-d₆ in ppm (δ)): 1.037-1.026 (m, 4H, cyclopropane), 3.329 (m, 4H, 2XCH₂), 3.769 (m, 4H, 2XCH₂), 3.805(s, 3H, -OCH₃), 4.173 (m, 1H, cyclopropane), 7.784-7.743(d, 1H, Ar-H), 8.707(s, 1H, Ar-H), 14.931 (s, 1H, -COOH); ¹³C NMR (75 MHz) (DMSO-d₆) in ppm (δ): 174.4, 164.3, 154.3, 147.8, 145.3, 132.5, 129.7, 124.9, 110.5.5, 106.8, 68.2, 56.9, 54.6, 35.8, 8.3; IR (KBr) cm⁻¹: 3415 (br, -CO), 3394-2979 (-C-H), 2847(-C-H), 1748 (-CO), 1652 (-CO), 1639, 1541, 1515, 1419 (C=C), 1172 (-C-O), 1119 (-C-F); Mass (LC-MS) m/z: 363.1 [M+H]. Anal. Calcd.for C₁₈H₁₉FN₂O₅: C, 59.66; H, 5.29; N, 7.73; Found: C, 59.62; H, 5.27; N, 7.72.

1-Cyclopropyl-6-fluoro-8-methoxy-4-oxo-7-(piperidin-1-yl)-1,4-dihydroquinoline-3-carboxylic acid (3b): ¹H NMR (300 MHz), (DMSO-d₆ in ppm (δ)): 1.045-1.027(m, 4H, -CH₂), 1.659(m, 6H, 3X-CH₂), 3.32(m, 4H, 2XCH₂), 3.761(s, 3H,-OCH₃), 4.189-4.154 (m, 1H, -CH), 7.750-7.720(s, 1H,Ar-H), 8.696 (s,1H, Ar-H), 15.02(s, 1H, -COOH); ¹³C NMR (75 MHz) (DMSO-d₆) in ppm (δ): 177.2, 166.9, 147.2, 147.0, 146.0, 131.9, 128.7, 120.2, 108.3, 106.5, 55.9, 52.7, 36.9, 26.2, 24.9,8.3; IR (KBr) cm⁻¹: 3382(-CO), 2991(-C-H), 2960 (-C-H), 2858(-C-H), 1729 (-CO), 1633(-CO), 1520, 1451(C=C), 1273(-C-O), 1112(-C-F);Mass (LC-MS) m/z: 361.34 [M+ H]. Anal. Calcd.for C₁₈H₂₁FN₂O₄: C, 63.32; H, 5.87; N, 7.77; Found: C, 63.31; H, 5.85; N, 7.74.

1-Cyclopropyl-6-fluoro-8-methoxy-4-oxo-7-thiomorpholino-1,4-dihydroquinoline-3-carboxylic acid (3c): ¹H NMR (300 MHz), (DMSO-d₆ in ppm (δ)): 0.855-0.931(m, 6H, 3x-CH₂), 1.269(m, 4H, 2x-CH₂), 2.18-2.26 (m, 4H, 2x-CH₂), 2.78-2.79 (m, 4H, 2x-CH₂), 3.62 (m, 4H, -CH₂), 3.81 (s, 3H, -OCH₃), 4.45-4.44(m, 1H, -CH), 7.789-7.792(d, 1H, Ar-H), 9.08(s, 1H, Ar-H); ¹³C NMR (75 MHz) (DMSO-d₆) in ppm (δ):174.7, 162.7, 155.6, 146.8, 145.9, 133.4, 129.2, 124.4, 108.9,106.8, 56.3, 54.6, 37.3, 29.2, 8.2; FT-IR (KBr), cm⁻¹: 3452(-CO), 2980(-CH), 2111(-C-H), 1709(C=O), 1628(C=O), 1551(C=C), 1473(C=C), 1445(-C-H), 1415(C=C), 1368(C=C), 1335(C-N), 1297(C-O); Mass (LC-MS) m/z: 379.38[M+H]. Anal. Calcd.for C₁₈H₁₉FN₂O₄S; C, 57.13; H, 5.06; N,7.40; Found: C, 57.11; H, 5.01;N, 7.38.

1-Cyclopropyl-7-(2,6-dimethylmorpholino)-6-fluoro-8-methoxy-4-oxo-1,4-dihydroquinoline-3-carboxylic acid (3d): ¹H NMR (300 MHz, DMSO-d₆, δ, ppm):1.14-0.86(m, 4H, cyclopropane), 1.21(m, 6H, 2XCH₃), 1.36 (m, 1H, cyclopropane), 2.7(m, 2H, -CH₂), 3.10(m, 2H, -CH₂), 3.702(s, 3H, -OCH₃), 3.84 (m, 2H -CH₂), 7.95-7.953 (d, J = 9.3 Hz,1H, Ar-H), 8.70 (s, 1H, Ar-H), 14.99 (s, 1H, -COOH); ¹³C NMR (75 MHz) (DMSO-d₆) in ppm (δ):175.9, 165.9, 147.5, 145.0, 133.4, 128.7, 127.9, 110.2, 68.9,74.6, 56.1, 37.9, 20.5,8.2; IR (KBr) cm⁻¹: 3345(-CO), 2725(-C-H), 2562(-C-H), 1745(-CO), 1645(-CO), 1492(-C=C), 1210 (-C-O); Mass (LC-MS) m/z: 391.42[M+H]. Anal. Calcd.for C₂₀H₂₃FN₂O₅: C, 61.53; H, 5.94; N, 7.18; Found: C,61.52; H, 5.91;N,7.16

1-Cyclopropyl-7-(6,7-dihydrothieno[3,2-c]pyridin-5(4H)-yl)-6-fluoro-8-methoxy-4-oxo-1,4-dihydroquinoline-3-carboxylic acid (3e): ¹H NMR (300 MHz), (DMSO-d₆ in ppm (δ)): 1.07(m, 4H, cyclopropane), 3.07-3.00(t, 2H, -CH₂), 3.705(t, 2H, -CH₂), 3.72(s, 3H, -OCH₃), 4.19(m, 1H, -CH), 4.44(s, 2H, -CH₂), 6.934(s, 1H, Ar-H), 7.361(s, 1H, Ar-H), 7.84(s, 1H, Ar-H), 8.719(s, 1H, Ar-H), 14.97(s, 1H, -COOH); ¹³C NMR (75 MHz) (DMSO-d₆) in ppm (δ):177.2, 165.2, 159.1, 146.3, 145.6, 134.9, 132.7, 131.7, 126.3, 124.9, 124.0, 123.8, 108.9, 107.7, 56.5, 55.8, 55.4, 36.7, 25.4, 8.4; IR (KBr) cm⁻¹: 3395(-CO), 2974(-C-H), 2940(-C-H), 1731(-CO), 1664 (-CO), 1415(-C=C), 1251(-C-O), 1215 (-C-F);Mass (LC-MS) m/z: 415.12[M+H]. Anal. Calcd.for C₂₁H₁₉FN₂O₄S: C, 60.86; H, 4.62; N, 6.76; Found: C, 60.84;H, 4.60; N, 6.72.

1-Cyclopropyl-6-fluoro-8-methoxy-4-oxo-7-(2-oxo-7,7a-dihydrothieno[3,2-c]-pyridin-5(2H, 4H, 6H)-yl)-1,4-dihydroquinoline-3-carboxylic acid (3f): ¹H NMR (300 MHz), (DMSO-d₆ in ppm (δ)): 1.07(m, 4H, cyclopropane), 3.07-3.01 (m, 4H), 3.71(s, 2H, -CH₂), 3.72(s, 3H, -OCH₃), 4.19(m, 1H, cyclopropane), 4.44(m, 2H, -CH₂), 7.84-7.81(s, 1H, Ar-H), 8.72(s, 1H, Ar-H), 14.99(s, 1H, -COOH); ¹³C NMR (75 MHz) (DMSO-d₆) in ppm (δ):188.3, 177.2, 165.2, 164.2, 159.1, 146.3, 145.6, 132.7,124.9, 123.0, 123.7, 108.5, 106.3, 69.2, 58.8,55.8, 47.8, 37.7, 34.6, 8.1; IR (KBr) cm⁻¹: 3383(-CO), 2950(-C-H), 2920(-C-H), 1780(-CO), 1732(-CO), 1645 (-CO), 1420(-C=C), 1235(-C-O), 1150 (-C-F); Mass (LC-MS) m/z: 431.35[M+H]. Anal. Calcd.for C₂₁H₁₉FN₂O₅S: C, 58.60; H, 4.45; N, 6.51; Found: C, 58.56; H, 4.42; N, 6.49.

1-Cyclopropyl-7-(4-(2,3-dichlorophenyl)-piperazin-1-yl)-6-fluoro-8-methoxy-4-oxo-1,4-dihydroquinolin-3-carboxylic acid (3g): ¹H NMR (300 MHz), (DMSO-d₆ in ppm (δ)): 1.42-1.35 (m, 4H, cyclopropane), 3.29-3.67 (m, 8H, 4XCH₂), 3.71 (m, 1H, cyclopropane), 3.74(s, 3H, -OCH₃), 7.28-7.73(m, 3H, Ar-H), 8.06(s, 1H, Ar-H), 8.56(s, 1H, Ar-H), 13.98 (s, 1H, -COOH); ¹³C NMR (75 MHz) (DMSO-d₆) in ppm (δ):176.7, 165.8, 158.4, 151.3, 146.9, 144.3, 133.2, 130.1, 128.4, 126.4, 124.5, 123.9, 118.3, 109.2, 106.2, 56.5, 55.8, 49.5, 47.8, 37.1, 8.1;IR (KBr) cm⁻¹: 3412 (-CO), 2920 (-C-H), 2849 (-C-H), 2122 (-C-H), 1734 (-CO), 1610 (-CO), 1414 (-C=C), 1297 (-C-H), 1167 (-C-O), 1120 (-C-F); Mass (LC-MS) m/z: 507.10[M+H]. Anal. Calcd.for C₂₄H₂₂Cl₂FN₃O₄: C, 56.93; H, 4.38; N, 8.30; Found: C, 56.89; H, 4.35; N, 8.28.

1-Cyclopropyl-6-fluoro-7-(4-(7-fluorobenzo[d]isoxazol-3-yl)piperidin-1-yl)-8-methoxy-4-oxo-1,4-dihydroquinoline-3-carboxylic acid (3h): ¹H NMR (300 MHz), (DMSO-d₆, in ppm (δ)) : 1.15-1.05(m, 4H, cyclopropane), 1.23-1.19(m, 4H, -CH₂), 2.04-2.01(m, 4H, -CH₂), 3.61(m, 1H, -CH), 3.82(s, 3H, -OCH₃), 4.20(m, 1H, -CH), 7.36-7.33(m, 2H, Ar-H), 7.80-7.72 (m, 1H, Ar-H), 8.08(s, 1H, Ar-H), 8.72(s, 1H, Ar-H), 14.97(s, 1H, -COOH). ¹³C NMR (75 MHz) (DMSO-d₆) in ppm (δ): 176.1, 164.9, 158.9, 149.7, 147.5, 146.9, 144.3, 143.8, 133.2, 128.4, 124.5, 125.3, 123.7, 118.9, 118.4, 109.2, 106.2, 56.3, 51.2, 28.4, 26.2, 37.8, 8.1; IR (KBr) cm⁻¹: 3402(-CO), 2980(-C-H), 2129(-C-H), 1747(-CO), 1666(-CO), 1415(-C=C), 1123(-C-F), 1078(-C-O); Mass (LC-MS) m/z: 496.38[M+H]. Anal. Calcd. for C₂₆H₂₃FN₃O₅: C, 63.03; H, 4.68; N, 8.48; Found: C, 62.98; H, 4.67; N, 8.46.

1-Cyclopropyl-7-(5,6-dihydro-[1,2,4]-triazolo[4,3-a]-pyrazin-7(8H)-yl)-6-fluoro-8-methoxy-4-oxo-1,4-dihydroquinoline-3-carboxylic acid (3i): ¹H NMR (300 MHz), (DMSO-d₆, in ppm (δ)): 1.13(m, 4H, 2x -CH₂), 1.32 (m, 1H, -CH), 3.73(s, 3H, -OCH₃), 3.83(m, 2H, CH₂), 3.96(m, 2H, CH₂), 4.61 (s, 2H, CH), 7.03(s, 1H, Ar-H), 7.63(s, 1H, Ar-H), 7.96(s, 1H, triazole-H), 14.99(s, 1H, -COOH); ¹³C NMR (75 MHz) (DMSO-d₆) in ppm (δ): 176.7, 165.8, 165.0, 158.4, 143.6, 146.5, 147.5, 133.8, 127.3, 124.5, 109.6, 105.7, 61.5, 59.2, 56.3, 37.2, 35.8, 8.1; IR (KBr) cm⁻¹: 3375(-CO), 2853(-C-H), 2621(-C-H), 1765(-CO), 1635(-CO), 1520(-C=C), 1223(-C-O), 1025(-C-F); Mass (LC-MS) m/z: 400.38[M+H]. Anal. Calcd. for C₁₉H₁₈FN₅O₄: C, 57.14; H, 4.54; N, 17.54; Found: C, 57.12; H, 4.52; N, 17.52.

Table-I: Physical data, optimization conditions with yield % of compounds 3a-3i

Entry	M.P (°C)	Reflux		Microwave	
		Time(h)	Yield (%)	Time min)	Yield* (%)
3a	152-154	5.0	78%	10	85%
3b	129-130	5.0	80%	10	87%
3c	230-232	5.0	79%	10	86%
3d	202-203	5.0	78%	10	88%
3e	198-200	5.0	76%	10	92%
3f	208-210	5.0	80%	10	90%
3g	287-288	5.0	77%	10	87%
3h	225-227	5.0	75%	10	87%
3i	195-197	5.0	78%	10	88%

* Isolated yield after column purification

Antimicrobial Screening

All the compounds 3a-i prepared herein were screened for antibacterial and antifungal activities against different strains of bacteria and fungi.

Minimal Inhibitory Concentration (MIC)

The antimicrobial activity was assayed in vitro by two-fold broth dilution⁴³ against bacteria: Escherichia coli ATCC 25922, Bacillus subtilis ATCC 1633, and Staphylococcus aureus ATCC 25923 and fungi, Candida albicans ATCC 2091, Aspergillus niger ATCC 9029 and Candida krusei ATCC 6258. The minimal inhibitory concentrations (MIC in µg/mL) were defined as the lowest concentrations of a compound that completely inhibited the growth of each strain. All compounds dissolved in DMSO were added to culture media. Mueller-Hinton Broth for bacteria and Sabouraud Liquid Medium for fungi were used to obtain the final concentrations ranging from 125 µg/mL to 1.592 µg/mL. The amount of DMSO never exceeded 1% v/v. Inocula consisted of 5.0 x 10⁴ bacteria/mL and 1.0 x 10³ fungi/mL. The MICs were noted after incubation at 37°C for 24 hr (bacteria) and 30°C for 48 hr (fungi). Media with 1% v/v DMSO were employed as growth controls. Chloramphenicol and fluconazole were used as reference antibacterial and anti-fungal drugs, respectively.

Antibacterial Activity




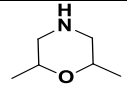
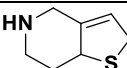
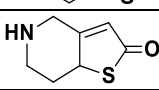
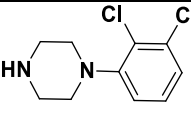
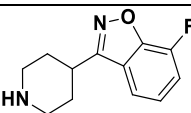
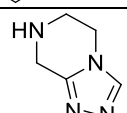
The newly synthesized compounds 3a-i and standard drug, chloramphenicol were screened for antibacterial activity against bacterial strains namely Escherichia coli ATCC 25922, Bacillus subtilis ATCC 1633, and Staphylococcus aureus ATCC 25923 at a concentration of 250 µg/mL by using filter paper disc method⁴⁴. DMSO served as control. The discs of Whatman filter paper were prepared with standard size (7.0 mm) and kept in 1.0 Oz screw-capped wide-mouthed containers for sterilization and hot-air oven at a temperature of 150°C. Then, the prepared solution of test compounds and standard drug (dissolved in DMSO) of desired concentration were poured into their respective bottles. Further, the discs were transferred to the inoculated plates with a pair of fine pointed tweezers. To prevent contamination, tweezers may be kept with their tips in

70% alcohol and flamed off before being used. Before using the test organisms, which were grown on nutrient agar, they were sub-cultured in nutrient broth at a temperature of 37°C for 18-20 hr. Thereafter, the plates were incubated for 24 hr at a temperature of 37°C. Zones of inhibition in millimeters have indicated the relative susceptibility of the bacteria to the compounds 3a-i and the standard drug, chloramphenicol.

Antifungal Activity

The recently synthesized compounds **3a-i** and the standard medicine, fluconazole, were rated for their antifungal activity by employing the standard agar slice prolixity method⁴⁵. The following strains of fungi have been used in this study *Candida albicans* ATCC 2091, *Aspergillus niger* ATCC 9029, and *Candida krusei* ATCC 6258. All societies were maintained on Sabouraud Dextrose Agar (SDA) and incubated at 30 °C. To prepare homogeneous dormancy of the below-mentioned fungi for the slice assays, they were grown in Sabouraud broth, centrifuged to collect the bullet, and softened with saline. The fungal bullet was homogenized in a sterile handheld homogenizer. This suspense was also plated onto SDA using a fungal spreader to obtain an indeed growth field. The discs of Whatman sludge paper were prepared with standard size (6.0 mm) and kept in 1.0 Oz screw-limited wide-mouthed containers for sterilization. These sterilized discs were impregnated with 250 µg/ mL attention of the colorful test composites and standard medicine, fluconazole. These discs were also placed in the center of each quadrant of an SDA plate. Each plate had one control slice impregnated with DMSO. The plates were incubated at 30 °C. After 48 hr, the plates were removed and the radius of the zone of inhibition (in mm) was measured. Care was taken not to cache the plates.

Table II: Antimicrobial data of compounds **3a-i** against tested bacterial and fungal strains

Entry	R	Antibacterial activity [#]			Antifungal activity [#]		
		E.coli ATCC 25922	B.substilis ATCC 1633	S.aureus ATCC 25923	C.albicans ATCC 2091	A.nigar ATCC 9029	C.krusei ATCC 6258
3a		15	10	14	—	—	—
		(100)	(100)	(>125)			
3b		21	19	17	—	—	—
		(50)	(12.5)	(>125)			
3c		21	16	18	20	12	11
		(25)	(20)	(50)	(30)	(25)	(25)
3d		12	13	10	—	—	—
		(>125)	(50)	(>125)			
3e		22	25	25	30	24	18
		(20.5)	(12.5)	(15.2)	(18)	(12)	(17)
3f		20	22	19	25	22	18
		(21.5)	(15.5)	(16.5)	(20)	(10)	(12)
3g		20	16	19	12	9	10
		(24)	(25)	(30)	(25)	(28)	(34)
3h		27	23	22	26	23	21
		(12.0)	(6.25)	(11.5)	(8.25)	(10.5)	(7.5)
3i		30	26	28	28	23	21
		(6.25)	(3.125)	(6.25)	(3.125)	(12.5)	(1.592)
^a Control		0	0	0	0	0	0
Chloroamphenicol		26	23	22			
		(12.5)	(6.25)	(12.5)			
Fluconazole					29	22	19
					(6.25)	(12.5)	(3.125)

Concentration was 250 µg/mL.

^aDMSO served as control.

‘-’ Denotes no inhibition zone was observed.

Values in brackets are of MIC

CONCLUSION

We have reported the synthesis of novel 1-cyclopropyl-6-fluoro-8-methoxy-7-substituted-4-oxo-1, 4-dihydroquinolin-3-carboxylic acids using inexpensive and commercially available materials under the microwave method. The microwave method offers several advantages including quite simple, time-saving, high yielding, and most importantly an eco-friendly reaction procedure. Almost all the series of compounds **3a-i** showed moderate to excellent activity towards the bacteria and fungi under investigation. Some of them, particularly **3h** and **3i** can be exploited for the formulation of bactericide and fungicide after a detailed study.

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Eco-Friendly Synthesis of 9-Aryl-6-[2-(Trifluoromethyl) Phenyl][1,2,4]Triazolo [4,3-A]-[1,8]Naphthyridines

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ABSTRACT

In this article, an efficient, environmentally benign, solvent-free synthesis of 9-aryl-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridines **8** is achieved by the oxidation of aryl aldehyde 1-{3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-yl}hydrazones **7** with alumina-supported iodobenzene diacetate [PhI(OAc)₂-Al₂O₃] in the solid state. The reaction proceeds efficiently at room temperature in high yields and in a state of high purity. The structures of compounds **3-8** are assigned on the basis of their spectral (IR, ¹H NMR and MS) and analytical data.

Keywords: 1, 8-Naphthyridine, 1, 2, 4-Triazole, PhI (OAc)₂-Al₂O₃, Solid state

1. INTRODUCTION

Fused 1,2,4-triazoles are of considerable interest on account of their intriguing structural, chemical and biological properties. There are several methods available in the literature for the synthesis of fused 1,2,4-triazoles¹⁻⁵. However, some of these methods suffer from disadvantages such as long reaction times, lower yields, requirement of severe conditions and using strong or toxic oxidants. Therefore, the development of new methods with greater efficacy, straightforward procedures and better yields still desirable. 1,8-Naphthyridine derivatives have attracted considerable attention owing to their effective biological activity and extensive use⁶⁻⁹. Fluorine containing organic compounds constitute an area of rapidly growing interest because of their unique physical and biological properties¹⁰. Iodobenzene diacetate [PhI(OAc)₂] is very versatile oxidizing agent and is of much importance in its synthetic utility. The development of new strategies for the preparation of organic molecules in neat conditions is a challenging area of organic synthesis. For instance, a large number of organic reactions are typically carried out under anhydrous conditions, using volatile organic solvents like benzene, which are the cause of environmental problems and are also potentially carcinogenic. Hence, it is required to develop safe, practical and environment friendly processes¹¹⁻¹³. The pioneering work of Toda et al. has shown that many exothermic reactions, can be accomplished in high yield by just grinding solids together using mortar and pestle, a technique known as ‘Grindstone Chemistry’ which is one of the ‘Green Chemistry Techniques’. Reactions are initiated by grinding, with the transfer of very small amount of energy through friction¹⁴⁻¹⁶. In addition to being energy efficient Grindstone Chemistry also results in high reactivity and less waste products. In view of these facts, and in continuation of the interest on solid state organic transformations of 1,8-naphthyridine derivatives¹⁷, herein is reported a simple, efficient and convenient method for the 9-aryl-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridines using alumina-supported iodobenzene diacetate [PhI(OAc)₂-Al₂O₃] in solid state.

2. CHEMISTRY

Condensation of 2-aminonicotinaldehyde **1** with 2-(trifluoromethyl)phenylacetonitrile **2** in the presence of solid KOH under solvent-free grinding conditions in a mortar at RT furnished 3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-amine **3**, which is converted into 3-[2-(trifluoromethyl)phenyl]-1,2-dihydro[1,8]naphthyridin-2-one **4** on treatment with HNO₂. Compound **4** on reaction with POCl₃ under reflux afforded 2-chloro-3-[2-(trifluoromethyl)phenyl][1,8]naphthyridine **5**, which on hydrazinolysis with hydrazine hydrate in boiling methanol afforded 1-{3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-yl}hydrazine **6**.

The hydrazine **6** on condensation with a variety of aromatic aldehydes in the presence of catalytic amount of PTSA in solvent-free grinding conditions at RT resulted in the formation of corresponding aryl aldehyde 1-{3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-yl}hydrazones **7** in excellent yields.

Oxidative cyclization of hydrazones **7a-j** with PhI(OAc)₂-Al₂O₃ in solid state at RT afforded the respective 9-aryl-6-[2-(trifluoromethyl) phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridines **8a-j** (Scheme 1). Reactions are not time consuming and the yields of the products are very good. The oxidative transformation is very clean, rapid

and efficient. The reaction conditions and work-up procedures are mild, simple and convenient. The recyclability of the alumina support makes this an environmentally friendly green protocol. The purity of the product is high, process is environmentally benign and experimental procedure is very simple.

In a typical case, a mixture of hydrazone **7a** (Ar = C₆H₅) and PhI(OAc)₂-Al₂O₃ was ground in a mortar by pestle at RT for 7.5 min. The reaction mixture is treated with methanol followed by simple processing afforded 9-phenyl-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridine **8a** (Ar = C₆H₅) in 88% yield. The generality of the facile oxidative transformation was established by treating other hydrazones **7b-j** with PhI(OAc)₂-Al₂O₃ under solid state grinding conditions to get the corresponding 1,2,4-triazolo[4,3-a][1,8]naphthyridines **8b-j**.

The structures of compounds **3-8** were determined by their elemental analyses and spectral (IR, ¹H NMR and MS) data.

3. CONCLUSION

To the best of our knowledge this is the first report on rapid synthesis of 1,2,4-triazolo[4,3-a][1,8]naphthyridines using PhI(OAc)₂-Al₂O₃ in the solid state at RT. The significant advantages of this procedure are: high yields of the products, short reaction times, non-toxicity of the reagent, mild reaction conditions, economic viability, operational simplicity, excellent purity and minimum environmental impact.

4. EXPERIMENTAL

Melting points were determined on a Cintex melting point apparatus and are uncorrected. Thin layer chromatograms were run on Merck silica gel 60 F₂₅₄ precoated plastic sheets (layer thickness 0.2 mm). IR spectra (KBr) were recorded on a Perkin-Elmer spectrum BX series FT-IR spectrophotometer, ¹H NMR spectra on a Varian Gemini 300 MHz spectrometer, using tetramethylsilane as an internal standard (δ=0), and chemical shifts are reported in parts per million. Analysis of all new compounds gave satisfactory analytical results and was performed by Perkin-Elmer 240 CHN analyser. The 2-(trifluoromethyl)-phenylacetonitrile **2** was purchased from Aldrich Chemical Company.

5. SYNTHESIS AND CHARACTERIZATION

3-[2-(Trifluoromethyl) phenyl] [1, 8] naphthyridin-2-amine (3)

A mixture of 2-aminonicotinaldehyde (**1**, 0.01 mol), 2-(trifluoromethyl) phenylacetonitrile (**2**, 0.01 mol) and solid KOH (0.01 mol) was ground by pestle and mortar at RT for 2.0 min. After completion of the reaction, as monitored by TLC, the reaction mixture was digested with cold water. The solid that precipitated was filtered, washed with water and purified by recrystallization from methanol to give **3**. Yield 96%, Mp 276 °C, IR (KBr) ν_{\max} (cm⁻¹): 3485, 3078 (NH₂), 1641 (C-NH₂), 1594 (C=N), ¹H NMR (CDCl₃ + DMSO-d₆, 300 MHz): δ 6.10 (s, 2H, NH₂), 7.85 (m, 1H, C₆-H), 8.07 (m, 1H, C₅-H), 8.18 (s, 1H, C₄-H), 8.75 (m, 1H, C₇-H), 7.15-7.75 (m, 4H, Ar-H); Anal. Calculated for C₁₅H₁₀F₃N₃: C 62.28, H 3.48, N 14.53; Found: C 62.41, H 3.50, N 14.57.

3-[2-(Trifluoromethyl) phenyl]-1, 2-dihydro [1, 8] naphthyridin-2-one (4)

To a cold solution of **3** (0.01 mol) in 2 M HCl (25 mL) was added NaNO₂ solution (0.01 mol in 25 mL water) and the reaction mixture was stirred at RT for 0.5 h and treated with chilled water. The separated solid was filtered, washed with water and purified by recrystallization from methanol to furnish **4**. Yield 95%, Mp 208°C, IR (KBr) ν_{\max} (cm⁻¹): 3447 (NH), 1660 (C=O), 1605 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.95 (m, 1H, C₆-H), 8.10 (s, 1H, C₄-H), 8.25 (m, 1H, C₅-H), 8.81 (m, 1H, C₇-H), 7.37-7.84 (m, 4H, Ar-H), 12.67 (brs, 1H, NH); Anal. Calculated for C₁₅H₉F₃N₂O: C 62.07, H 3.13, N 9.65; Found: C 62.19, H 3.15, N 9.69.

2-Chloro-3-[2-(trifluoromethyl) phenyl] [1, 8] naphthyridine (5)

A mixture of **4** (0.01 mol) and POCl₃ (10 mL) was refluxed for 1.5 h. The reaction mixture was cooled and poured onto a mixture of crushed ice and NaHCO₃. The precipitate thus obtained was filtered, washed with water and purified by recrystallization from ethanol to afford **5**. Yield 94%, Mp 188°C, IR (KBr) ν_{\max} (cm⁻¹): 1607 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.82 (m, 1H, C₆-H), 8.13 (s, 1H, C₄-H), 8.25 (m, 1H, C₅-H), 9.16 (m, 1H, C₇-H), 7.38-7.70 (m, 4H, Ar-H); Anal. Calculated for C₁₅H₈ClF₃N₂: C 58.36, H 2.61, N 9.07; Found: C 58.50, H 2.64, N 9.11.

1-{3-[2-(Trifluoromethyl) phenyl] [1, 8] naphthyridin-2-yl} hydrazine (6)

A mixture of **5** (0.01 mol) and hydrazine hydrate (0.015 mol) in methanol (20 mL) was refluxed on a water bath for 4.0 h. The reaction mixture was cooled and poured into ice-cold water. The separated solid was filtered, washed with water and purified by recrystallization from ethanol to furnish **6**. Yield 95%, Mp 203°C, IR

(KBr) ν_{\max} (cm^{-1}): 3442, 3272 (-NHNH₂), 1623 (C-NHNH₂), 1600 (C=N), ¹H NMR (CDCl₃, 300 MHz): δ 5.92 (brs, 2H, NH₂), 7.82 (m, 1H, C₆-H), 7.98 (m, 2H, C₄-H, C₅-H), 8.87 (m, 1H, C₇-H), 7.20-7.83 (m, 5H, NH, 4Ar-H); Anal. Calculated for C₁₅H₁₁F₃N₄: C 59.21, H 3.64, N 18.41; Found: C 59.33, H 3.66, N 18.46.

General procedure for the synthesis of aryl aldehyde 1-{3-[2-(trifluoromethyl)-phenyl]-[1,8]naphthyridin-2-yl}hydrazones (7a-j)

A mixture of **6** (0.01 mol), aromatic aldehyde (0.01 mol) and PTSA (0.015 mol) was ground by pestle and mortar at RT for specified time (Table 1). On completion of the reaction (monitored by TLC), the reaction-mixture was treated with ice-cold water. The resulting solid product was filtered, washed with water and purified by recrystallization from ethanol to afford **7a-j** (Table 1).

1-Benzaldehyde 1-{3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-yl}hydrazone (7a): Yield 94%, Mp 110°C, IR (KBr) ν_{\max} (cm^{-1}): 3362 (NH), 1629 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.80 (m, 1H, C₆-H), 8.10 (m, 1H, C₅-H), 8.38 (s, 1H, C₄-H), 8.42 (m, 1H, C₇-H), 8.57 (m, 1H, N=CH), 7.03-7.76 (m, 9H, Ar-H), 10.20 (s, 1H, NH); Anal. Calculated for C₂₂H₁₅N₄F₃: C 67.34, H 3.85, N 14.28; Found: C 67.47, H 3.88, N 14.32.

4-Methylbenzaldehyde 1-{3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-yl}hydrazone (7b): Yield 96%, Mp 150 °C, IR (KBr) ν_{\max} (cm^{-1}): 3351 (NH), 1626 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 2.37 (s, 3H, CH₃), 7.65 (m, 1H, C₆-H), 7.78 (m, 2H, C₄-H, C₅-H), 8.35 (m, 1H, C₇-H), 8.26 (s, 1H, N=CH), 6.98-7.60 (m, 8H, Ar-H), 10.18 (s, 1H, NH); Anal. Calculated for C₂₃H₁₇N₄F₃: C 67.97, H 4.22, N 13.79; Found: C 68.09, H 4.24, N 13.83.

4-Methoxybenzaldehyde 1-{3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-yl}hydrazone (7c): Yield 93%, Mp 103 °C, IR (KBr) ν_{\max} (cm^{-1}): 3359 (NH), 1630 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 3.84 (s, 3H, OCH₃), 7.72 (m, 3H, C₄-H, C₅-H, C₆-H), 8.35 (m, 1H, C₇-H), 8.20 (s, 1H, N=CH), 6.84-7.65 (m, 8H, Ar-H), 10.10 (s, 1H, NH); Anal. Calculated for C₂₃H₁₇N₄OF₃: C 65.40, H 4.06, N 13.26; Found: C 65.54, H 4.09, N 13.31.

2-Chlorobenzaldehyde 1-{3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-yl}hydrazone (7d): Yield 94%, Mp 130 °C, IR (KBr) ν_{\max} (cm^{-1}): 3356 (NH), 1628 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.80 (m, 2H, C₄-H, C₆-H), 8.20 (m, 1H, C₅-H), 8.37 (m, 1H, C₇-H), 8.70 (s, 1H, N=CH), 7.01-7.70 (m, 8H, Ar-H), 10.16 (s, 1H, NH); Anal. Calculated for C₂₂H₁₄N₄F₃Cl: C 61.91, H 3.31, N 13.13; Found: C 62.02, H 3.34, N 13.18.

4-Chlorobenzaldehyde 1-{3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-yl}hydrazone (7e): Yield 96%, Mp 90 °C, IR (KBr) ν_{\max} (cm^{-1}): 3346 (NH), 1627 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.76 (m, 2H, C₄-H, C₆-H), 8.02 (m, 1H, C₅-H), 8.25 (m, 1H, C₇-H), 8.40 (s, 1H, N=CH), 7.03-7.72 (m, 8H, Ar-H), 10.12 (s, 1H, NH); Anal. Calculated for C₂₂H₁₄N₄F₃Cl: C 61.91, H 3.31, N 13.13; Found: C 62.03, H 3.33, N 13.17.

4-Fluorobenzaldehyde 1-{3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-yl}hydrazone (7f): Yield 95%, Mp 135°C, IR (KBr) ν_{\max} (cm^{-1}): 3350 (NH), 1629 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.78 (m, 2H, C₄-H, C₆-H), 8.15 (m, 1H, C₅-H), 8.37 (m, 1H, C₇-H), 8.54 (s, 1H, N=CH), 7.00-7.75 (m, 8H, Ar-H), 10.15 (s, 1H, NH); Anal. Calculated for C₂₂H₁₄N₄F₄: C 64.39, H 3.44, N 13.65; Found: C 64.51, H 3.47, N 13.69.

2-Nitrobenzaldehyde 1-{3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-yl}hydrazone (7g): Yield 93%, Mp 75 °C, IR (KBr) ν_{\max} (cm^{-1}): 3358 (NH), 1630 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.92 (m, 2H, C₄-H, C₆-H), 8.32 (m, 1H, C₅-H), 8.40 (m, 1H, C₇-H), 8.72 (s, 1H, N=CH), 7.08-7.82 (m, 8H, Ar-H), 10.18 (s, 1H, NH); Anal. Calculated for C₂₂H₁₄N₅O₂F₃: C 60.41, H 3.23, N 16.01; Found: C 60.52, H 3.25, N 16.05.

3-Nitrobenzaldehyde 1-{3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-yl}hydrazone (7h): Yield 94%, Mp 115°C, IR (KBr) ν_{\max} (cm^{-1}): 3362 (NH), 1631 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.80 (m, 2H, C₄-H, C₆-H), 8.12 (m, 1H, C₅-H), 8.42 (m, 1H, C₇-H), 8.56 (s, 1H, N=CH), 7.05-7.70 (m, 8H, Ar-H), 10.20 (s, 1H, NH); Anal. Calculated for C₂₂H₁₄N₅O₂F₃: C 60.41, H 3.23, N 16.01; Found: C 60.54, H 3.26, N 16.07.

4-Nitrobenzaldehyde 1-{3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-yl}hydrazone (7i): Yield 95%, Mp 142°C, IR (KBr) ν_{\max} (cm^{-1}): 3360 (NH), 1630 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.85 (m, 2H, C₄-H, C₆-H), 8.25 (m, 1H, C₅-H), 8.45 (m, 1H, C₇-H), 8.68 (s, 1H, N=CH), 7.06-7.78 (m, 8H, Ar-H), 10.17 (s, 1H, NH); Anal. Calculated for C₂₂H₁₄N₅O₂F₃: C 60.41, H 3.23, N 16.01; Found: C 60.53, H 3.25, N 16.06.

3,4-Dimethoxybenzaldehyde 1-{3-[2-(trifluoromethyl)phenyl][1,8]naphthyridin-2-yl}hydrazone (7j): Yield 94%, Mp 125°C, IR (KBr) ν_{\max} (cm⁻¹): 3320 (NH), 1629 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 3.90 (s, 3H, OCH₃), 3.97 (s, 3H, OCH₃), 7.65 (m, 2H, C₄-H, C₆-H), 7.78 (m, 1H, C₅-H), 8.34 (m, 1H, C₇-H), 8.22 (s, 1H, N=CH), 6.82-7.50 (m, 7H, Ar-H), 10.08 (s, 1H, NH); Anal. Calculated for C₂₄H₁₉N₄O₂F₃: C 63.71, H 4.23, N 12.38; Found: C 63.84, H 4.26, N 12.43.

General procedure for the synthesis of 9-aryl-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridines (8a-j)

A mixture of appropriate hydrazone **7a-j** (0.01 mol) and PhI(OAc)₂-Al₂O₃ (0.01 mol) was ground in a mortar by pestle at RT for the period indicated in Table 1. After complete conversion as indicated by TLC, the reaction mixture was treated with methanol (30 mL). The methanol solution was poured into ice cold water (50 mL), the solid thus obtained was filtered, washed with water and purified by recrystallization from ethanol to give **8a-j** (Table 1).

9-Phenyl-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridine (8a) : Yield 88%, Mp 155°C, IR (KBr) ν_{\max} (cm⁻¹): 1612 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.90 (m, 2H, C₃-H, C₅-H), 8.15 (m, 1H, C₄-H), 8.48 (m, C₂-H), 7.25-7.72 (m, 9H, Ar-H); Anal. Calculated for C₂₂H₁₃N₄F₃: C 67.69, H 3.36, N 14.35; Found: C 67.82, H 3.39, N 14.40.

9-(4-Methylphenyl)-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridine (8b) : Yield 89%, Mp 180°C, IR (KBr) ν_{\max} (cm⁻¹): 1608 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 2.46 (s, 3H, CH₃), 7.85 (m, 2H, C₃-H, C₅-H), 8.13 (m, 1H, C₄-H), 8.50 (m, 1H, C₂-H), 7.25-7.80 (m, 8H, Ar-H); Anal. Calculated for C₂₃H₁₅N₄F₃: C 68.31, H 3.74, N 13.85, Found: C 68.45, H 3.77, N 13.89.

9-(4-Methoxyphenyl)-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridine (8c) : Yield 88%, Mp 198°C, IR (KBr) ν_{\max} (cm⁻¹): 1618 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 3.90 (s, 3H, OCH₃), 7.88 (m, 2H, C₃-H, C₅-H), 8.15 (m, 1H, C₄-H), 8.52 (m, 1H, C₂-H), 7.02-7.73 (m, 8H, Ar-H); Anal. Calculated for C₂₃H₁₅N₄O₂F₃: C 65.71, H 3.60, N 13.33; Found: C 65.84, H 3.63, N 13.38.

9-(2-Chlorophenyl)-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridine (8d) : Yield 90%, Mp 220°C, IR (KBr) ν_{\max} (cm⁻¹): 1603 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.90 (m, 2H, C₃-H, C₅-H), 8.14 (m, 1H, C₄-H), 8.42 (m, 1H, C₂-H), 7.25-7.75 (m, 8H, Ar-H); Anal. Calculated for C₂₂H₁₂N₄F₃Cl: C 62.20, H 2.85, N 13.19; Found: C 62.34, H 2.87, N 13.25.

9-(4-Chlorophenyl)-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridine (8e) : Yield 92%, Mp 222°C, IR (KBr) ν_{\max} (cm⁻¹): 1602 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.87 (m, 2H, C₃-H, C₅-H), 8.18 (m, 1H, C₄-H), 8.53 (m, 1H, C₂-H), 7.27-7.72 (m, 8H, Ar-H); Anal. Calculated for C₂₂H₁₂N₄F₃Cl: C 62.20, H 2.85, N 13.19; Found: C 62.35, H 2.88, N 13.24.

9-(4-Fluorophenyl)-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridine (8f): Yield 91%, Mp 230°C, IR (KBr) ν_{\max} (cm⁻¹): 1605 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.88 (m, 2H, C₃-H, C₅-H), 8.15 (m, 1H, C₄-H), 8.50 (m, 1H, C₂-H), 7.20-7.68 (m, 8H, Ar-H); Anal. Calculated for C₂₂H₁₂N₄F₄: C 64.71, H 2.96, N 13.92; Found: C 64.83, H 2.98, N 13.97.

9-(2-Nitrophenyl)-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridine (8g) : Yield 86%, Mp 153°C, IR (KBr) ν_{\max} (cm⁻¹): 1619 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.85 (m, 2H, C₃-H, C₅-H), 8.12 (m, 1H, C₄-H), 8.40 (m, 1H, C₂-H), 7.22-7.70 (m, 8H, Ar-H); Anal. Calculated for C₂₂H₁₂N₅O₂F₃: C 60.69, H 2.78, N 16.09; Found: C 60.83, H 2.81, N 16.13.

9-(3-Nitrophenyl)-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridine (8h) : Yield 86%, Mp 240°C, IR (KBr) ν_{\max} (cm⁻¹): 1618 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.90 (m, 2H, C₃-H, C₅-H), 8.22 (m, 1H, C₄-H), 8.50 (m, 1H, C₂-H), 7.28-7.75 (m, 8H, Ar-H); Anal. Calculated for C₂₂H₁₂N₅O₂F₃: C 60.69, H 2.78, N 16.09; Found: C 60.84, H 2.80, N 16.12.

9-(4-Nitrophenyl)-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridine (8i): Yield 88%, Mp 252°C, IR (KBr) ν_{\max} (cm⁻¹): 1615 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 7.88 (m, 2H, C₃-H, C₅-H), 8.20 (m, 1H, C₄-H), 8.52 (m, 1H, C₂-H), 7.25-7.72 (m, 8H, Ar-H); Anal. Calculated for C₂₂H₁₂N₅O₂F₃: C 60.69, H 2.78, N 16.09; Found: C 60.82, H 2.81, N 16.13.

9-(3,4-Dimethoxyphenyl)-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridine (8j): Yield 87%, Mp 208°C, IR (KBr) ν_{\max} (cm⁻¹): 1611 (C=N); ¹H NMR (CDCl₃, 300 MHz): δ 3.92 (s, 3H, OCH₃), 3.98 (s, 3H, OCH₃), 7.87 (m, 2H, C₃-H, C₅-H), 8.17 (m, 1H, C₄-H), 8.53 (m, 1H, C₂-H), 7.00-7.70 (m, 7H, Ar-H); Anal. Calculated for C₂₄H₁₇N₄O₂F₃: C 64.00, H 3.80, N 12.44; Found: C 64.12, H 3.83, N 12.48.

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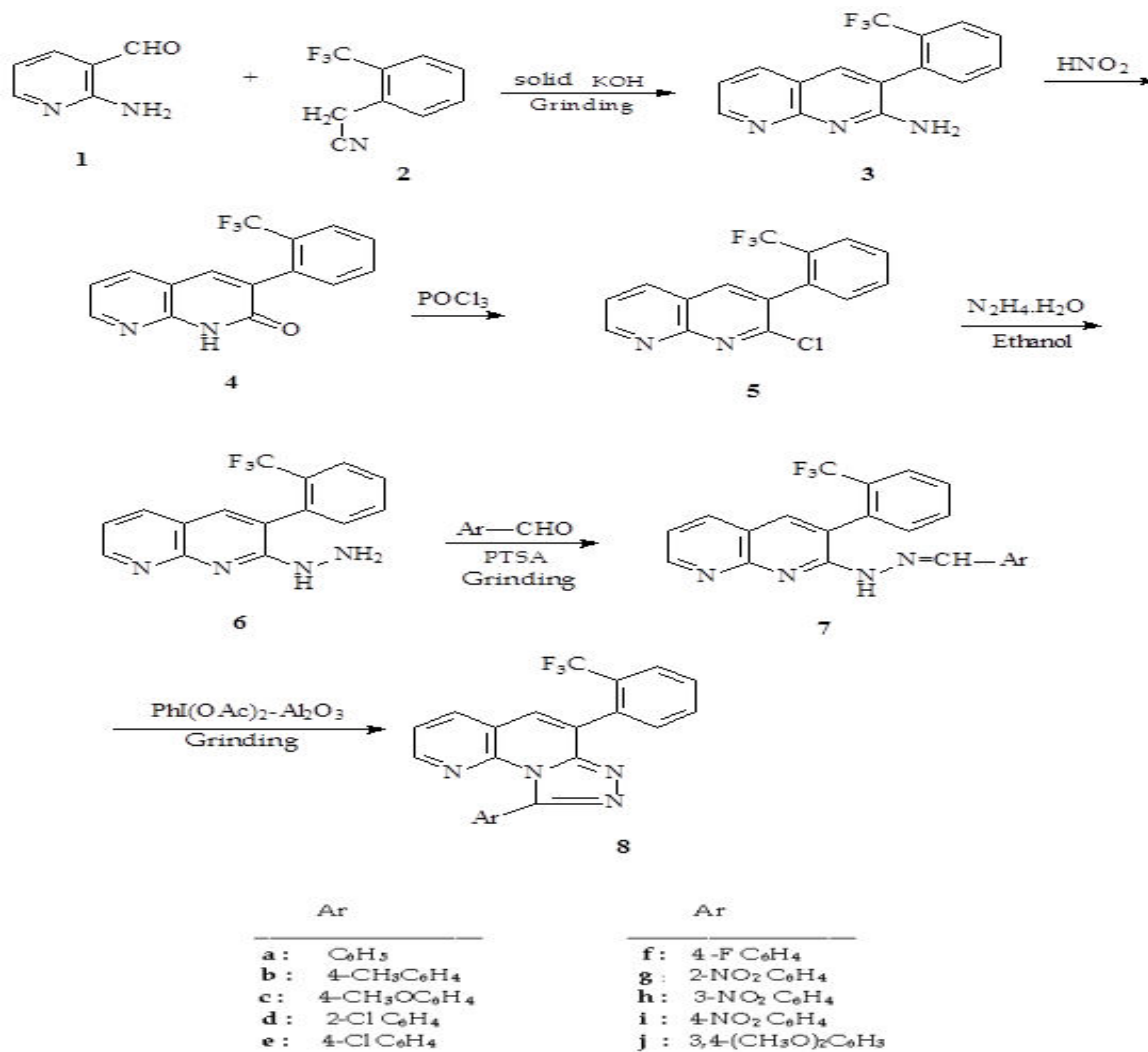
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CONFLICT OF INTEREST

Authors have no conflict of interest



Scheme 1. Synthetic routes to the 9-Aryl-6-[2-(trifluoromethyl)phenyl][1,2,4]triazolo[4,3-a][1,8]naphthyridines **8**

Table 1: Physical data compounds **7a-j** & **8a-j**

Compd	Ar	Reaction Time (min)	Compd	ReactionTime (min)
7a	C ₆ H ₅	2.0	8a	7.5
7b	4-CH ₃ C ₆ H ₄	2.5	8b	8.0
7c	4-CH ₃ OC ₆ H ₄	2.5	8c	8.5
7d	2-ClC ₆ H ₄	2.0	8d	8.0
7e	4-ClC ₆ H ₄	2.5	8e	7.5
7f	4-FC ₆ H ₄	2.0	8f	8.0
7g	2-NO ₂ C ₆ H ₄	2.5	8g	8.0
7h	3-NO ₂ C ₆ H ₄	2.0	8h	8.5
7i	4-NO ₂ C ₆ H ₄	2.5	8i	8.5
7j	3,4-(CH ₃ O) ₂ C ₆ H ₃	2.0	8j	7.5

Assessment of Water Quality Index of Open Cast Stone Chips Mines Dumkadanga

Baby Mandal
S.K.M.U.Dumka

ABSTRACT

Water is an important resource of earth. It is very useful for every living organism and all metabolic activities. But purest form of water is only about 2-3% which is presents in glacier and various fresh water sources like rivers, lakes, ponds and in the form of ground water. Human being are mostly dependent on ground sources hence the load on ground water sources is increases day by day. So we have to think for an alternative source of water so that the load on ground water sources should be decreased. Open cast coal mines and stone chips mines stored water can be used for an alternative source. Present study is focused on calculations on water quality index of open cast stone chips mines Udalbani and Dumkadanga a place of Pakur district in Jharkhand. Water quality index (WQI) measure the quality of water used for drinking, irrigation or other purposes.

Keywords: Open Cast mines, Ground water, water quality index (WQI), metabolic activities,

INTRODUCTION

Various studies are done on stored water of open cast coal mines and stone chips mines in different places. Pakur is a new born dist. of Jharkhand of plature region. It covers hilly region where there is huge scarcity of water all over the year and the people living nearby this hilly region dependent on surface water sources of open cast coal mines or stone chips mines. Due to large deposition of coal and stones, various crushers mines and coal mines are present in this area. Here mining is of open cast type and after mining huge deposition of water is present in this mines. Various research studies are done on water quality of Pakur district but these mines water remain untouched by other researcher. After assessment of water quality index WQI value of these mines water it can be used for irrigation and other purposes.

MATERIAL AND METHODS

Various samples are collected from stone chips mines and coal in doubly washed plastic container. Samples were collected for two consecutive years 2017 and 2018 as per standard procedure by 'APHA' (1) in three different seasons summer season, winter season and rainy season. Water is tested for 15 different parameters. Some of its parameters like DO, temperature and PH are tested in sampling site. Rest parameters are tested in S.K.M. University lab. It's WQI value is calculated for different parameters.

RESULT AND DISCUSSION

WQI value is calculated for different parameters by following formula. WQI value for different parameters are shown below in tabular form

CALCULATION

Water quality index is calculated in three steps "Water Programme 2007" (2), Ramkrishan et al (3) at first each parameter assign a weight (w_i), according to its relative important in the overall quality of water for drinking purpose based on percentage of samples within the permissible limit as per the standard. Weight of 5, 4, 3, 2, 1 are assign to the quality parameters when 0-20, 21-40, 41-60, 61-80, and 81-100% of the samples are within the permissible limit respectively Ray Chaudhuri et al (4).

Secondly then relative weight (W_i) is calculated from using the following equation.

$$W_i = \frac{w_i}{\sum_{i=1}^n w_i}$$

$$\sum_{i=1}^n w_i$$

Where, W_i = Relative weight

w_i = Weight of each parameters

n = Number of parameters

Third steps involve assignment of quality rating scale q_i . It is calculated as below

$$q_i = (C_i/S_i) \times 100$$

Where q_i denote the quality rating, C_i denoted the concentration of each 1 parameter in each water samples in mg/L, and S_i is the Indian drinking water or irrigation water standard for each chemical parameter in mg/L according to guidelines of the BIS 10500, FAO respectively.

For computing the WQI, the S_{li} is first determined for each sample for every parameter which is then use to determine WQI.

$$S_{li} = W_i \times q_i$$

$$WQI = \sum_{i=1}^n S_{li}$$

Where S_{li} is sub index of i th parameters, q_i is quality of i th parameters and n is the number of parameters.

Food and Agriculture Organisation (FAO) Standard and Calculation of Relative Weight:-

Parameter	FAO Standard	Udalbani		Dumkadanga	
		Weight	Relative wt.	Weight	Relative wt.
p ^H	6 – 8.5	1	0.0769	1	0.07142
TH	712	1	0.0769	1	0.07142
Cl	1065	1	0.0769	1	0.07142
F	1.5	1	0.0769	1	0.07142
SO ₄ ²⁻	1920	1	0.0769	1	0.07142
NO ₃ ⁻	45	1	0.0769	1	0.07142
Ca	400	1	0.0769	1	0.07142
Mg	60	1	0.0769	1	0.07142
Na	920	1	0.0769	1	0.07142
K	2	4	0.307	5	0.3571
TOTAL		13	1	14	1

Table 5.3: Calculation Table of Quality Rating Scale (q_i) and Sub-Index (SI) for Different Water Quality Parameter for Irrigation Purpose :-

Parameter	Udalbani			Dumkadanga		
	Values (mg/L)	qi	SI	Values (mg/L)	qi	SI
p ^H	8.4	140.0	10.77	8.5	141	10.07
TH	155	21.7	1.669	148	20.7	1.478
Cl	24.5	2.3	0.177	36.0	3.38	0.241
F	0.1	6.66	0.512	0.2	13.3	0.949
SO ₄ ²⁻	5.9	0.30	0.023	12.9	0.67	0.048
NO ₃ ⁻	2.7	6.0	0.461	3.3	7.33	0.524
Ca	44.00	11.0	0.846	35.0	8.75	0.625
Mg	12.3	20.5	1.576	19.4	32.3	2.307
Na	29.4	3.19	0.245	45.0	4.89	0.349
K	5.7	285	87.50	7.4	370	132.13
WQI value	103.779		WQI =	148.718		

NOTE:- WQI values <150 – Class-I
values 300 – 450 – Class – III

WQI values 150 – 300 – Class – II
WQI values > 450 – Class - IV

WQI

CONCLUSION

The WQI values obtains shows that the water samples of Udalbani stone mines is better than and Dumkadanga stone chips mines but all are in desirable limit of WQI value. All the water samples obtained from different sampling station can be used for irrigation purposes.

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Automated Code Compliance for Safety of Masonry Building

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ABSTRACT

Safety throughout and after construction is a major responsibility of Governments and indirectly that of the construction company. To follow this responsibility Governments, develop building codes. But compliance assessment of building codes is a time-consuming process and tedious job, being the complexity of codes and further subdivisions and cross-references in the building codes. With the immense technical developments and advancement in Building Information Modelling provision for automation of code compliance checking process and improvement in the potency of the building design process and its execution takes place. The main intention of this paper is to provide a framework of rules for automated compliance checking procedures in the design of a building, keeping into consideration the safety aspect of masonry Buildings with code IS:1905-1987. Reports generated were checked for their validation and precision.

Keywords: BIM, Masonry Structure, National Building Codes, IFC, FreeCAD

INTRODUCTION

Governing bodies must approve building designs before the actual execution of construction work in every country. These approvals are based on checking whether specific designs meets the necessities of the building codes or not. The objectives of the building codes "is to meet the minimum requirements of safety to the public health, general welfare through structural strength means of facilities, sanitation, stability, energy conservation, sufficient light and ventilation, and safety to life and property from fire and other hazards attributed to the built environment and provisions for safety to firefighters and emergency responders in time of emergency operations" [1]. Building codes are generated by competent authorities and may vary from country to country. Code compliance with manual checking is a long-time procedure. It is error-prone and tedious due to various existing codes with further sub-division and cross-referencing between its clauses. The building codes do not provide any help or description. But with automation in code compliance minimise the error caused by manual code checking. It can provide help to the administrative authority with a reliable and regular framework for checking code compliance.

Digital representation of entities for design is required to deal with the constraints of the building code. Previously automated code compliance relied on CAD. As CAD supply, the technical drawings incorporate a low level of information of a building design. But with the evolution of technology and advancements in the design process, (BIM) Building Information Modeling provide a suitable digital representation [2]. These models got the 3D geometry of the building and semantics of each element in the form of objects [3]. The National Committee in BIM Standard describes BIM as a digital illustration of physical entities, functional features of these facilities, and a collective knowledge resource center for data information [4] as BIM provide a virtual construction of a building, which helps in distinctive clash detection and removal in advance before the actual occurrence thereby minimising in project costs and possible delays. This research paper develops an automatic code compliance checking system of building models with respective Building Codes for structural safety regarding masonry elements like walls, Columns, Buttresses, Piers, etc. National Building Codes of India [5]. The evolution of a code compliance system can be considered an important e-governance system tool that further provides a potential for better service delivery at minimal costs to increase public services efficiency, which aims to furnish an open environment for efficiently writing rules.

RELATED WORK

Research work in the automation of building codes or standards checking systems has been started since the seventies. One most important study in this area has been done by [6], who explored decision tables to represent AISC standard specifications. As per Fenves, the automating process of building code compliance is a multifaceted and very difficult task to perform in computer-aided design for building due to codes' complications and lack of representation of models for code checking.

For decades, great efforts and trials from worldwide trade associations, research groups, and software developers have made trial for the computer-aided building for code compliance inspection. A combined hypertext and information-based computer tool have been developed [7] to boost the HASES (Health and Safety

Expert System) code compliance checking system focused on possession and code risks in the National Building Code of Canada. An integrated client/server framework for compliance checking of a design against a building code for disabled accessibility is demonstrated by [8].

Many investigators used an object-oriented representation of buildings and their codes for the checking process. A prototype model for automation of building code inspection system re has been developed by [9], where building designs and codes are represented using the OO (object-oriented) model. An object-based building modelling approach was followed [10] to represent building designs and codes to support the automation online code-checking process in a circulated environment. An object-based interpretation of rules is made for code checking [11].

Many efforts are being made worldwide to automate rule checking of buildings with the development of IFC building representations as input. The CORENET project in Singapore, the HITOS project development through Norwegian Statsbygg; is an effort from the Australian Building Coding Board and International Code Council of US and their General Services, Management struggle [12]. Fully reviewed previous study for computerised code compliance and found the key requirements for automated code checking. Various issues for integrating building codes in CAD are examined by [13]. A good framework for Automatic Code Compliance Analysis for Structure Envelope Design is provided by [14]. [15] A comparison was made for the strengths and weaknesses of major compliance checking systems and examined the applicability of these tools for various safety clauses of codes. A Model View Checker is developed one top of the Bimserver.org framework for IFC models based on mvdXML format for constructing rules. IFC has a lot of limitations, such as partial-expression range, complications in segmentation of the information and the prospect of describing the same information in various ways [17]. These limitations can be improved by arranging semantic web languages. [18] used concepts of ontology for conversion of BIM into a building-specific feature-built model (FBM). A rule-based semantic approach is proposed by [19] that addresses the complexities in the regulations. A meaning of RASE-concept is used to convert code documents into rules for testing on BIM software [20]. [21] Used graphs to represent rules from different building codes. Various efforts are reviewed in the field of a compliance investigation. Many research efforts are location-specific, as each country/region has its own rules that can change from time to time. So, software for automated building code testing for one country cannot be used for any other country. Further, there is no possibility of adding new codes to the existing ruleset of items that require access to API (application programming interface) for additional programming. Research is still required to create object-based, extra efficient, shareable, standardised, and open-source representations for code arrangements and building designs. This research aims to develop an e-governance tool for code checking.

RESEARCH METHODOLOGY

The research method adopted is as follows: Studied building codes and represented them in the format ready for processing as per the requirement of automation software. The database building models were planned, implemented and created to represent models in ifc and mapping them into structural codes (e.g. IS-1905-1987).

Developed an automation compliance check script and framework to check safety compatibility. Evaluated the automation structure for its accuracy with the help of the handbook on masonry building SP20.

IMPLEMENTATION OF THE MODEL

Building Information Modeling is a digital format for representing the physical attribute, functional attributes, and properties of building units that provide physical structure information. It shows numerous ways by which the physical model of a structure can be exchanged in different domains. This shareable model representations in IFC is an open-source standard.

The IFC file may be of any format such as XML format (ISO 10303-28), text format (ISO 10303-21) or Zip format (zipped IFC-SPF file) as per the requirement. IFC is an ISO standard for interoperability, specified and developed by BuildingSMART, which provides an exchange of information throughout the project life cycle. The IFC standard represents the geometry and possessions of building items and their associations within building elements, which helps organise information across unsuitable applications [22] as per the requirement of BIM models. The IFC-SPF format is available in IFC 2X2, IFC 2X3 and IFC 4 versions. Whereas the model implemented in this proposed system works with IFC 4 format.

IFC files maintain the building meta-data which required to be extracted for developing applications. Many attributes such as length, area, and volume of a building element are directly available, whereas some information is not available and must be computed. e.g. if the selenderness ratio of a wall is to be calculated, which depends upon many other factors such as constraints available, sizes of opening, locations of opening

from the coordinates information, given by IfcCartesianPoints. There is certain availability of IFC file parsing applications in the market, but a few initiatives in the open-source domain have unlimited scope for checking code compliance [23].

The research work carried out in the current context can be understood using the stepped approach.

The purpose of adopting the stepped approach is that compliance applications will be scalable, easy to maintain, and reusable. In addition, the application will support a high degree of integration and interoperability with third-party or allow extension of the compliance system. The solution is designed with the separation of components having cohesive similar abstraction levels. The lowest level abstraction is step 1. It forms the basis of the system, and successive layers add more functionality interactively.

Step 1: In this very 1st step, physical buildings are planned and modelled, designed and built using any BIM software like Revit, Tekla, ArchiCAD, FreeCAD etc. In this context, FreeCAD [24] creates an IFC representation of physical building models. Various test cases are generated based on different models with varying complexity. Here the model of a wall is used as a reference, as shown in Figure 1

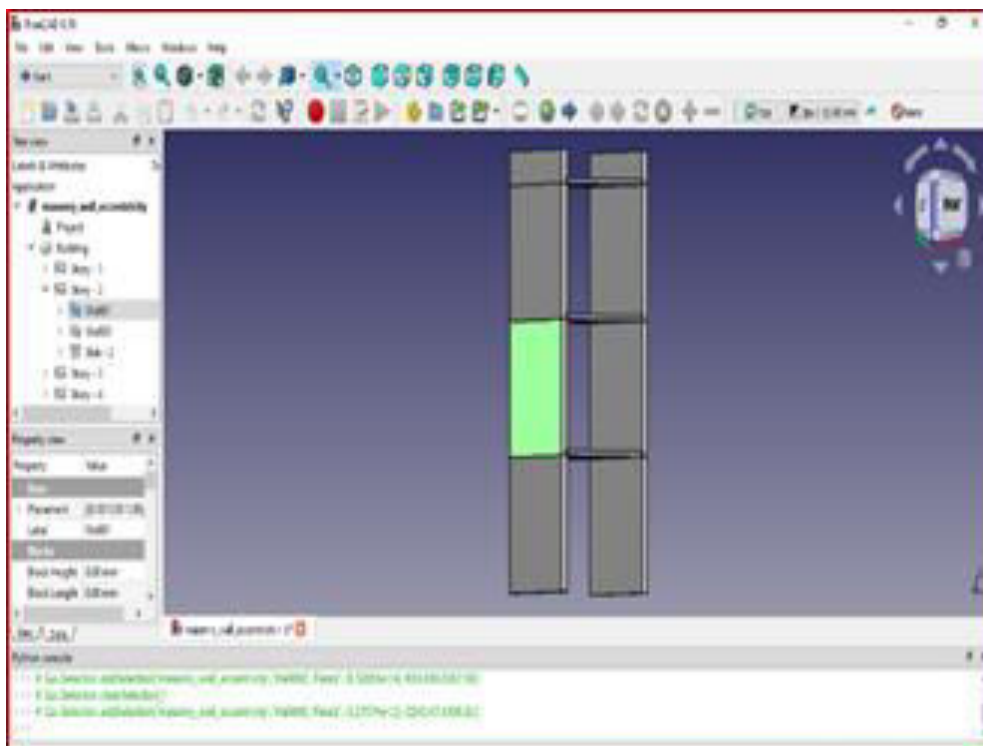


Figure 1: model of walls in FreeCAD

The focus of this paper is to check the wall information and its structural codes. So, the reference model contains various structural elements like columns, beams, slabs, floor etc., which are further connected with walls. For design conformance of physical building and finding dimensions of various building elements in the model is required to be checked.

Step 2: IFC file format is used to recover building model data required for code checking. A BIM model is created using FreeCAD (0.19) and exported in an IFC 4, including its geometry, parametric features, and supporting product libraries [25]. Various commercial and open-source IFC viewers can view IFC files such as DDS CAD Viewer, Model Viewer, Constructivity model viewer, BIM Vision, etc. But most of these support the IFC2x3 format of IFC. In this research work, Python application, based on the IFCopenshell library [26], is Programmed to view and abstract data from models saved in IFC 4 version. The extracted model data then work with the rule engine for compliance checking. Python 3.8.3 is used for application development.

Step 3: The IFC file generated from a building model is parsed at this step. The IFC file, when parsed, gives meta-data on the various elements of the building such as walls, slabs, columns etc. The information of each component needs to be semantically mapped with the National Building Code of India. This step extracts properties of required structural members, which are required to be checked as per IS:1905-1987 clauses in the National Building Code of India.

IFC entities contain references to each other, as shown in Figure 2.

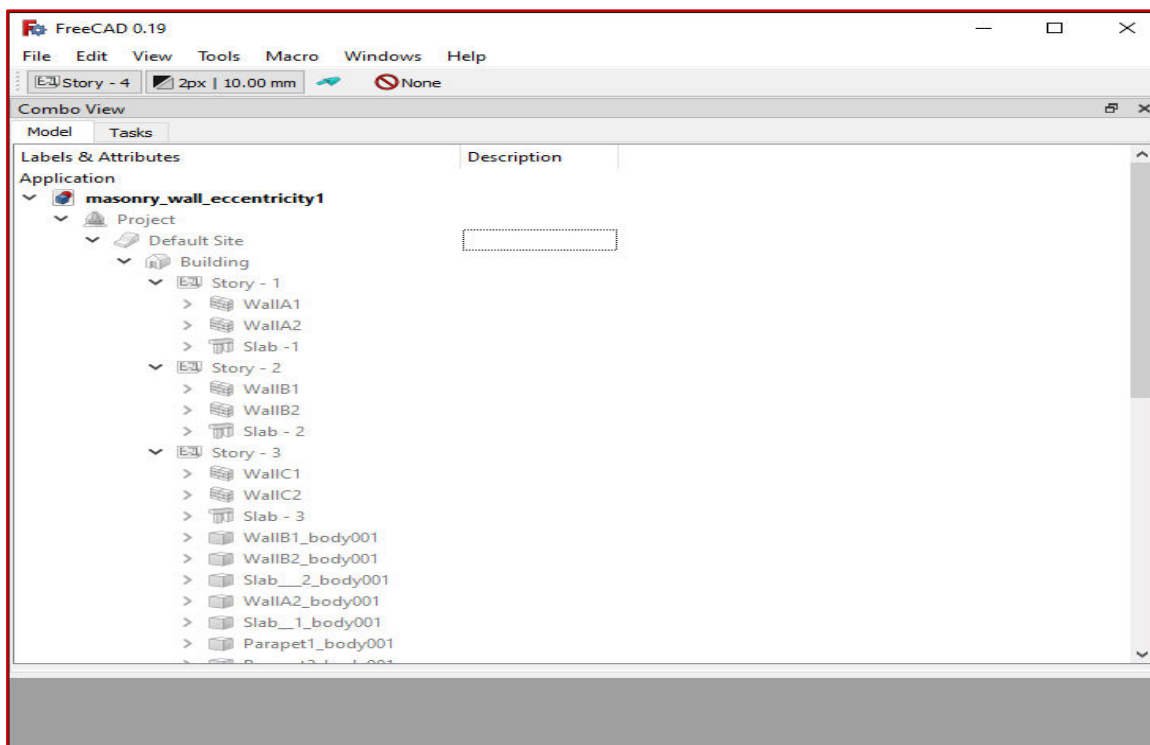


Figure 2: IFC sample file

Here `IfcRelContainedInSpatialStructure`, is used to assign elements to a certain level of the spatial project structure. `Ifcwall` contains reference to object placement (`IfcLocalPlacement`) and product representation (`IfcProductRepresentation`). The `IfcLocalPlacement` describes the relative location of a product concerning the placement of additional product or the final location of a product in the geometric depiction frameworkschutz of the project. It contains a further reference to attributes `PlacementRelTo` and `RelativePlacement`.

The structure of IFC4 specifications is designed as a hierarchal structure. To read and extend the hierarchical structure, the IFC data model is implemented as a Graph structure based on Graph Theory. Here nodes represent `Ifc` entities that start with "#", and edges represent the reference from one entity to another. To get the values of these attributes and properties, we need to traverse through the structure using an algorithm. A queue data structure is used to store the entities and referred entities that are then traversed using BFS (Breadth-First Search) approach where referred entities are considered adjacent nodes. The algorithm work on the model by iterating through IFC data instances as nodes of the graph structure. Figure 3 shows the extraction of the IFC element attributes from an IFC file.

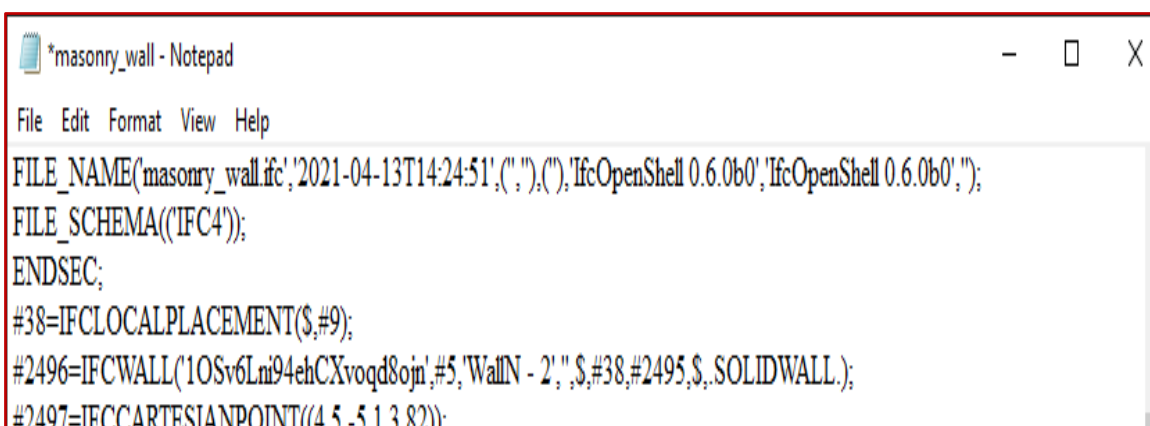


Figure 3: Views of IFC file Traversal Application

step 4: This step mainly deals with the rules database. Compliance checker systems map the IFC components Meta information like length, width, height, a cross-sectional area with IS 1905-1987 codes standards. The system is pre-fed by using the concept of master tables and transactional tables. The IFC standard hierarchy of components is pre-fed, and mapping occurs as the file is parsed. The system maps the input variables and output variables of both the standards. Figure 4 shows the rule engine with sample rule base from IS-1905-1987

```

*masonry_wall_ifc_helper.py - E:\masonry_wall_ifc_helper.py (3.8.3)*
File Edit Format Run Options Window Help
from typing import List, Optional, Union, Tuple, Set

import ifcopenshell
import ifcopenshell.geom

PRECISION = 4

settings = ifcopenshell.geom.settings()
settings.set(settings.USE_WORLD_COORDS, True)

class MasonryWallIfcHelper:
    def __init__(self, ifc_file: Union[str, ifcopenshell.file]):

        if isinstance(ifc_file, ifcopenshell.file):
            self.ifc_file = ifc_file
        else:
            self.ifc_file = ifcopenshell.open(ifc_file)

        def get_masonry_walls(
            self, building_level: Optional[int] = None
        ) -> List[ifcopenshell.entity_instance]:
            masonry_walls = [
                wall
                for wall in self.ifc_file.by_type("ifcwall")
                if wall.PredefinedType == "SOLIDWALL"
            ]
            if not building_level:
                return masonry_walls
            return [
                wall
                for wall in masonry_walls
    
```

Figure 4: Rule Engine

Step 5: In this step, code compliance is done. A rule expression is a mathematical form of the check, which must conform to government standards. The output variables are the variables that represent the result as conformance or nonconformance, or non-conclusive. The processing part consists of the mathematical expression having an arithmetic operator. The mathematical operator represents a greater to, less than (maximum and minimum) conditions of the rule. Table 1 shows the partial list of rules applied for a brick wall.

Table 1: Brick Wall Codes IS-1905-1987

S.No.	Checks	Formulae/ Value Used	Code	Clause	Page No.	Notations	Reasoning
1	Effective length	0.8*L	IS: 1905 - 1987	4.2.1.2 (b)	12	L= wall span	wall is cont. and is supported by cross wall and no opening within a range of H/8 or wall is cont. and is supported by piers
2		0.9*L				L= wall span	Wall is supported by a cross wall at one end and cont. with a cross wall at other end
3		1*L				L= wall span	Wall is supported at each by a cross wall or by pier
4		1.5*L				L= wall span	Wall is free at one end and cont. with a cross wall at other end or wall is free at one end and supported by pier at other
5		2*L				L= wall span	Wall is free at one end and supported by a cross wall at other end, or wall is free at one end and supported by pier at other

Table 2 shows the semantic mapping of IS-1905-1987, mathematical expression to the IFC standard. The formula is broken into IFC structure elements' dimensions as an input variable and expected output.

Table 2: Example of Semantic Mapping of the IFC to -1905-1987

S.No	Rule	RuleSet	IFC Structure	Mathematical Expression	Input	Output	Constant	Operator
1	wall	Ruleset 1	ifcwall	$L_{eff}/D_{eff} < 27$ or $H_{eff}/D_{eff} < 27$	ifcLength	True/False	27	less than
	slenderness ratio				ifcHeight	True/False		
2	column	Ruleset2	ifcColumn	$L_{eff}/D_{eff} < 12$ or $H_{eff}/D_{eff} < 12$	ifcLength	True/False	12	less than
	slenderness ratio				ifcHeight	True/False		
3	wall eccentricity	Ruleset2	ifcslab	$e/D = W^*(D/2 - x)$	ifcArea	True/False	3	Less than

Step 6: Once the semantic mapping of the checks is complete and fed into the system. The system can be used for running a full scan for compliance checking. This step finally generates compliance reports after importing the ruleset and processing the IFC and ruleset files. A CSV report is generated, which shows whether a particular rule for a specific element is valid. Figure 5 shows a sample conformance report.

Level	Element	Eff. Height	Eff. Length	Stiffening Coeff.	Eff. Thickness	Slenderness Ratio	valid/non valid	
Level 1	WallA - 1	2.82	1.303	1	0.1043	12.4928	TRUE	
	WallE - 1	2.82		1	0.1043	27.0374	FALSE	
	WallF - 1	2.82		1	0.2186	12.9003	TRUE	
	WallK - 1	2.82		1	0.1043	27.0374	FALSE	
	WallL - 1	2.82		1	0.1043	27.0374	FALSE	
	WallM - 1	2.82	1.0288	1	0.2186	4.7063	TRUE	
	WallV - 1	2.82	3.1814	1	0.2186	12.9003	TRUE	
	Level 2	WallO - 2	2.34	4.4196	1.3956	0.1456	16.0714	TRUE
		WallP - 2	2.34	1.4858	1	0.2186	6.7969	TRUE
		WallQ - 2	2.34	1.5773	1.1279	0.2466	7.2155	TRUE
WallY - 2		2.34	6.7818	1.1795	0.2578	9.0768	TRUE	
WallZ - 2		2.34		1	0.2186	10.7045	TRUE	

Figure 5: CSV Code compliance Report

RESULTS AND DISCUSSION

This research work checks structural codes IS-1905-1987 compliance by building custom rule sets for the IFC model. The application works for walls, columns, beams, slabs, footings elements. All these codes are translated into rule expression (mathematical) and entered into the rules database. A Python application extracts data from IFC model files and works with a rule engine to generate csv formatted reports. For the accuracy of the rule checking engine, the handbook on unreinforced masonry SP20 is compared for the reports'. The original contributions done so far by undertaking this research work is structural safety and conformance of building rule engine.

CONCLUSIONS AND FUTURE WORK

If we need a building of global standards and the human resources need the latest technologies in construction, we must follow globally accepted standards like IFC. This paper developed a framework for automation of code compliance, considering Indian National codes as an example. In developing countries like India, the use of BIM has just started. Its full adoption will take a long time. Inspecting the advantages of BIM, it needs to be

adopted for code checking tools. After study in full systematic literature study on the safety issue and compliance, it was found that a few commercial code checkers are available in the global market, and these are specific to some of the countries. Hence, there is an urgent need to build up such systems to take advantage of BIM for code compliance and thereby helping the governments as an e-governance tool. The proposed work is restricted to the module of the safety of masonry structure. For the future, it is suggested that further modules may be combined, including HVAC Controls, Construction, Electrical, Facilities Management and Building controls. The developed system is extensible for these modules.

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Synthesis of Derivatives of Methoxy Substituted Flavone

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ABSTRACT

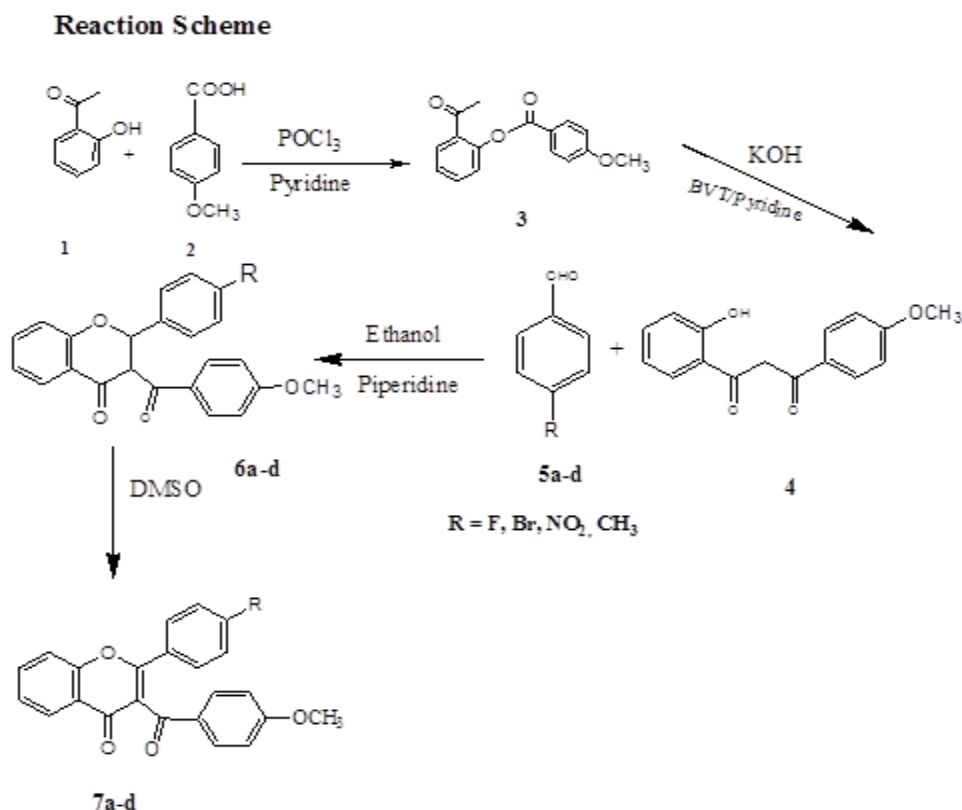
An efficient synthesis of 3-methoxy substituted Flavone and Flavanone derivatives has been achieved. Flavanone is obtained by cyclization of 1-(2-hydroxyphenyl)-3-(4-methoxyphenyl) propane-1,3-dione with various substituted aromatic benzaldehyde by using a catalytic amount of piperidine under a solvent of ethanol. Flavanone derivative was oxidized using I₂/DMSO to give Flavone. The entire reported compound has 72–80 percentage of isolated yield. Nitro group containing Flavone obtained more yield than another compound. All Synthesized compounds were characterized by ¹H NMR, IR, and Mass Spectroscopy.

Keywords: Flavonoids, Flavone, Flavanone, Aromatic aldehyde, BVT, Pyridine.

INTRODUCTION

Medicinal activities of the plants are recognized owing to the existence of various flavonoid. They contain polyphenolic compounds existent in varied plants occur naturally in foods of plant origin into flavanones, flavone, isoflavones, and flavanols. Flavanone are an assortment of common and natural compounds that are widely found in the plant kingdom and they give taste and color to plants. Flavonoid derivatives are premeditated for variety of pharmacological activities to delight unlike diseases. Flavone is a member of flavonoids and a class of natural products and exhibits anti-oxidant. Flavone derivatives are gifted to irritate the blood-brain barrier and amend the brain function. Flavones inhabit a distinctive place in the natural and synthetic organic chemistry owing to their useful biological activities. It was observed that plant-based flavanones in a diet are undeniably non-toxic and have no confrontational effect. Flavanones exhibit various pharmacological activities such as antioxidant which help to a justification for research worried to modulate events complicated in the mechanisms of cancer and cardiovascular dysfunction. Some flavones have potent antioxidant activity and the antioxidant activity of flavones in different materials varies because of their different chemical structures. Flavones occupy a special place in the realm of natural and synthetic organic chemistry owing to their useful biological activities such as activities of these polyphenolic compounds. Flavones have been enumerated as an efficient influence in healthy food. Zhao and co-worker deliberate the structure-activity relationships of flavone and found that 4-OH was important for inhibitory activity. Golub et al. synthesized novel flavone hydroxyl group-containing derivatives, and screened for anticancer activities. The 4-hydroxy group-containing compound exhibits good activities than the natural lead compound. The author also designed a series of flavone derivatives with alkanes substituted in 4-OH to generate ether.

The various number of compounds containing Flavone and Flavanone moiety exhibits good antioxidant activities of medicinal plants which is due to, flavonoids and phenolic acids, then carotene and vitamins. So large number of researcher studies on antioxidant activities last few years. These activities of Flavones are accompanied by other biological activities such as anti-virus, bacteriostatic, anti-aging, and anti-cancer activities. Some flavones show antioxidant activities different materials varies due to their different chemical structures. Flavones in POD are mostly categorized as high iso-flavones. Last few years POD has been used as raw material for the preparation of fermented foods, such as wine, bread, cake, tea, beverage, sauce, candy, etc. The compound containing iso-flavones derivatives has antioxidant activities due to the number of phenolic hydroxyl groups in their structure. Flavonoids have been the attention of numerous research in the search for discovering anti-COVID-19 drug candidates and involved considerable interest as potential SARS-CoV-2 inhibitor.



EXPERIMENTAL

General Methods and Materials

All solvents and reagents were picked up since Merck India Ltd and are of AR Grade and recycled without further purification. Melting Points were unwavering by the open capillary method and were uncorrected. Thin-layer chromatography (TLC) was implemented on silica. The spots were visualized by exposure to iodine vapor Nuclear magnetic resonance (NMR) spectra were recorded on a 400-MHz spectrometer for ¹H NMR. IR spectra of the compounds accomplished in potassium bromide (KBr) disks on a Bruker IR spectrometer. Mass spectra were recorded on a Waters ZQ-4000 spectrometer. The yields of the synthesized compounds were revealed for the isolated product.

Preparation of 2-Acetyl Phenyl 4-Methoxybenzoate (3)

o-hydroxy acetophenone (0.05 mmol) and anisic acid (0.005) were suspended in dry pyridine (30 ml) and this POCl₃ (3 ml) was added drop-wise with constant stirring and cooling. The reaction mixture was kept overnight and worked up dilution and acidification with ice-cold HCl (50 %) neutralizing pyridine. Thus the solid product obtained was filtered washed with water followed by sodium carbonate (10%) washing and finally again with water. It was crystallized from ethanol to obtain 2-acetyl phenyl 4-methoxybenzoate (3). **m.p. 110° C, yield 76 %.**

Preparation of 1-(2-Hydroxyphenyl)-3-(4-Methoxyphenyl) Propane-1, 3-Dione. (4)

2-acetyl phenyl 4-methoxybenzoate was dissolved in dry pyridine (40 ml) in 50 ml RBF. The solution warmed at the temperature of 60° C. Then crushed KOH (15 g) was added slowly with constant stirring at R.T. Reaction. Progress of the reaction was monitored by using a TLC plate. After four hours of heating, the reaction mixture was acidified by adding ice-cold dip. HCl (1:1). The brownish-yellow solid product thus separated was filtered, washed with NaHCO₃ (10%). Then wash again with cold water. Recrystallized using ethanol acetic acid mixture to acquire 1-(2-hydroxyphenyl)-3-(4-methoxyphenyl) propane-1,3-dione **m.p. 112° C, yield 74 %.**

Preparation of 3-Aroylflavanone.

1-(2-hydroxyphenyl)-3-(4-methoxyphenyl) propane-1,3-dione (0.012 mol) mixed with 4-substituted aldehyde (0.012 mol) in 25 ml of ethanol and piperidine (0.5 mol) in the 250 RBF. It was refluxed for 15-20 min. Progress of the reaction was monitored by using a TLC plate. After completion of the reaction, the reaction mass was cooled to R.T. It was acidified with dil. HCl (1:1) and the desired product were separated. Recrystallized from ethanol-acetic acid mixture to get the product (**6a**)

Preparation of 3-Anisoyl-2(3-Substituted Phenyl) Flavone.

A mixture of 3-Aroylflavanone (**6a**) (0.01mol) and iodine crystal was refluxed in DMSO (20 ml) for about 10 min in 250 ml RBF. Progress of the reaction was monitored by using a TLC plate. After completion of the reaction, the reaction mixture was cooled to R.T. The solid product was obtained, separated, it was washed with sodium thiosulphate solution. Finally, Recrystallize from ethanol acetic acid mixture to get the 3-benzoyl-2 (4 Fluro phenyl) 4-cholrophenyl flavone. (**7a**).

RESULTS AND DISCUSSION

Table 1: Physical data of synthesized compounds 6(a-d).

Entry	Compound	R	Reaction Time (Min)	Yield (%)	M.P. (°C)
1	6a	NO ₂	10	82	233
2	6b	Br	12	79	241
3	7c	F	12	76	167
4	7d	CH ₃	14	72	163

Table 2: Physical data of synthesized compounds 7(a-d).

Entry	Compound	R	Reaction Time (Min)	Yield (%)	M.P. (°C)
1	7a	NO ₂	10	84	162
2	7b	Br	12	78	117
3	7c	F	12	72	133
4	7d	CH ₃	14	76	141

We herein report the synthesis of various anisoyl-2(3-substituted phenyl) flavone derivatives. This synthetic approach signifies the most efficient route to a diverse synthesis of flavone reported in the literature. The synthesis occupations readily available starting materials and simple procedures make this method very attractive and convenient for the synthesis of various substituted flavone derivatives. The desired substituted flavone derivative **7(a-d)** was prepared in good yield through a multi-step reaction by using 3-anisoyl-2(3-substituted phenyl) flavone according to the procedure outlined in the reaction Scheme. 2-acetyl phenyl 4-methoxybenzoate was prepared from hydroxy acetophenone and anisic acid by using a standard method. 1-(2-hydroxyphenyl)-3-(4-methoxyphenyl) propane-1,3-dione was prepared by 2-acetyl phenyl 4-methoxybenzoate using potassium hydroxide in pyridine. 1-(2-hydroxyphenyl)-3-(4-methoxyphenyl) propane-1,3-dione was reacted with 4 substituted benzaldehyde in ethanol using a catalytic amount of piperidine and acetic acid to gives substituted flavanone. Flavanone derivative was oxidized using I₂/DMSO to give flavone. The formation of methoxy substituted flavone derivatives was confirmed by recording their IR, ¹H NMR, and mass spectra. IR spectrum of Flavone **7a** showed an absorption band at 3447 cm⁻¹ which is due to the aromatic stretching. An absorption band at 1672 is due to the C-O stretching of flavone which confirms the formation of flavone ring. The absorption band at 1661 cm⁻¹ is due to the stretching of the NO₂ group. The absorption band that appeared at 1596 cm⁻¹ is due to C=O (carbonyl group). The ¹H NMR spectrum of **7a** showed multiplet appeared at, 6.8 . Is due to aromatic proton. Similarly, a singlet appeared at 3.3 is due to the three protons of the methoxy group. The mass spectrum of **7a** showed a molecular ion peak at m/z 390, which is in agreement with the molecular formula C₂₃O₆H₁₅N.

Spectral Data of Methoxy Substituted Flavone Derivative

3-benzoyl-2 (4 nitro phenyl) 4-methoxyphenyl flavone (**7a**)

Molecular formula: C₂₃O₆H₁₅N yield: 84 %. m.p. 163 °C, IR (KBr) cm⁻¹ : 3447 (-CH Aromatic str), 1596(>C=O str); 1672 (C-O of Flavone); 1161 (Ar-NO₂ str); ¹H NMR (DMSO-d₆), 400 MHz, δ (ppm): 3.3 (s, 3H, OCH₃), 6.8(d, 4H), 7.34 (d, 4H), 7.5 (m, 2H), 7.91(m,2H), mass: 390 (M+1)

3-benzoyl-2 (4 bromo phenyl) 4-methox phenyl flavone (**7b**)

Molecular formula C₂₃O₄H₁₅Br: yield: 78 %, m.p. 117 °C IR (KBr) cm⁻¹ : 3479 (-CH Aromatic str), 1583(>C=O str), 1630 (C-O of Flavone); 530 (Ar-Br str); ¹H NMR (DMSO-d₆), 400 MHz, δ (ppm): 3.5 (s, 3H,OCH₃), 6.6(m, 3H), 6.7(m, 1H), 7.0(d, 2H), 7.5 (d, 4H), 8.0 (d, 2H), mass: 436 (M+1).

3-benzoyl-2 (4 Fluro phenyl) 4-methox phenyl flavone (**7c**)

Molecular formula C₂₃O₄H₁₅F: yield: 72 %, m.p.133 °C, , IR (KBr) cm⁻¹ : 3014 (-CH Aromatic str), 1601(>C=O str), 1161 (Ar-F str); ¹H NMR (DMSO-d₆), 400 MHz, δ (ppm): 3.4 (s, 3H,OCH₃), 6.8(m, 3H), 7.2(d, 4H), 7.3 (d, 2H), 7.9 (d, 2H), 8.4 (m, 1H), mass: 375 (M+1).

3-benzoyl-2 (4-methyl phenyl) 4-methoxy phenyl flavone (7d)

Molecular formula C₂₄O₄H₁₈: yield: 76 %, m.p. 141 °C, IR (KBr) cm⁻¹ : 3108 (-CH Aromatic str), 1591(>C=O str), 1503(C-O of Flavone); mass: 371 (M+1).

CONCLUSION

In Conclusion, we have synthesized a series of methoxy substituted Flavone and Flavanone by multistep reaction starting with hydroxy acetophenone and anisic acid by using a standard method. The compound containing nitro group at para position exhibit the highest yield among synthesized compound. All synthesized compounds are characterized by IR, ¹HNMR, Mass spectroscopic techniques.

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Persulphate/Ascorbic Acid Redox Pair Composite of Carboxymethylcellulose Grafted Guar Gum with TKP: Synthesis and Characterization

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ABSTRACT

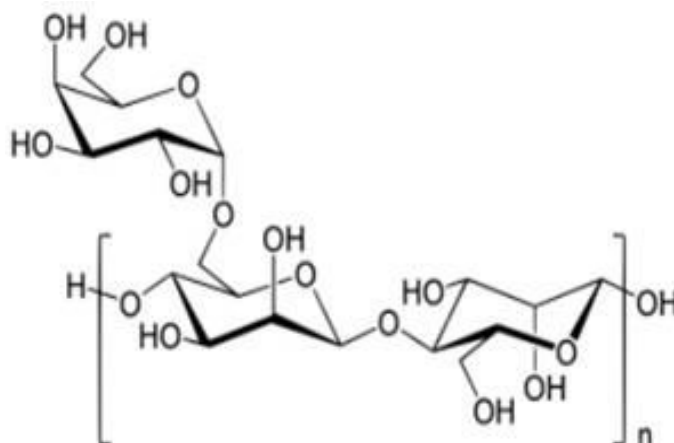
Natural polymers have drawn increased focus due to their advantages over synthetic polymers, including their wide availability, low cost, biodegradability, and non-toxicity. Improvements in the features and traits of macromolecules' backbones, such as an increase in gel strength and swelling index, resulting from the grafting of natural polymers. The main objective of this paper is to characterize and define the polymer grafting process. Guar gum was grafted with carboxymethyl cellulose (CMC) to create a new composite of Guar Gum and Tamarind Kernel Powder (TKP). The crosslinking process between guar gum and CMC was started using a redox pair of potassium persulphate and ascorbic acid, which started the grafting process. This grafted guar gum and TKP composite were created using a condensation technique and thermal treatment. FT-IR, MASS, NMR, and SEM studies were used to characterize the synthesized composite. Scanning electron microscopy (SEM), ¹H Nuclear Magnetic Resonance (NMR), mass spectroscopy, and Fourier Transform Infrared Spectra were used to identify the surface morphology, presence of distinct functional groups, and molecular weight, and characteristic peaks of the composite (FT-IR). According to the results, composites were successfully synthesized.

Keywords: redox pair, grafting, guar gum, TKP, composite.

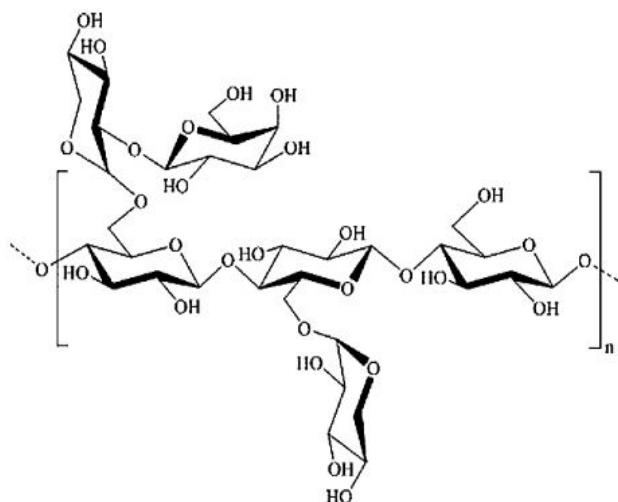
1. INTRODUCTION

Grafting is a process of modifying natural gums ^[1]. Natural gums are abundant in nature, and grafting alters their physical and chemical properties for practical use ^[2]. Grafting new semi-synthetic polymers with additional useful properties results in new semi-synthetic polymers. Guar gum (*Cyamopsis tetragonolobus*) is a leguminous plant that grows every year ^[3]. Guar gum is present in the endosperm of the seed. Guar gum is a polymer with a high molecular weight. Its chemical structure consists of (1→4) -β-D-mannopyranosyl units connected by 1→6 links to α-D-galactopyranosyl units ^{[4][5]}. At room temperature, it creates colloidal dispersions with water and adds exceptional viscosity. Because of this characteristic, natural guar gum and its derivatives are commercially significant and are used for a variety of purposes, including the sizing of paper and textiles, the binding of explosives and food, and oil well drilling ^[6]. CMC is an anionic cellulose derivative that is water-soluble. CMC has a high hygroscopicity due to its high hydrating capacity ^[7]. Carboxymethylcellulose (CMC), often known as a sodium salt (NaCMC), is a polyelectrolyte cellulose derivative that is widely used ^[8]. Tamarind is a plant that belongs to the Fabaceae family and has the botanical name *Tamarindus indica* ^[9]. It is a perennial fruit species that is known for its high fruit yield and adaptability to a variety of climates ^[10]. Tamarind seed polysaccharide possesses high viscosity, strong water absorption, good binding characteristics, adhesivity, and other qualities ^[11]. Grafting was done with Tamarind Kernel Powder (TKP).

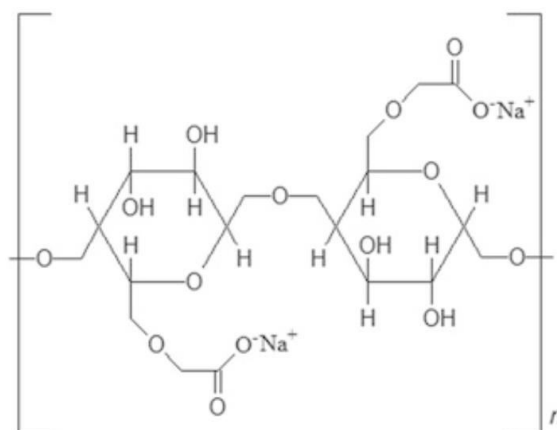
Because of its excellent grafting efficiency, low cost, and controlled reaction, the polymerization condensation method was chosen over all other grafting procedures.



Structure of Guar gum (GG)



Structure of Tamarind Seed Kernel Powder (TKP)



Structure of Carboxymethylcellulose (CMC)

2. MATERIALS AND METHOD

2.1 Materials

Guar gum (Shri Ram Industries, Basni, Jodhpur), Carboxymethylcellulose (Ases Chemical, Jodhpur), Ascorbic acid (Ases Chemical, Jodhpur), TKP (Ases Chemical, Jodhpur), Potassium persulphate (Ases Chemical, Jodhpur) were used without further purification. Ethanol, methanol, ammonium hydroxide (5N), and sodium hydroxide (1%) were also used.

2.2 METHOD

2.2.1 Synthesis of Carboxymethylcellulose Grafted Guar Gum with TKP (CMCG-GT) Composite

For the synthesis of the CMCG-GT composite, there are 3 main steps. They are as follows-

2.2.2 Preparation of Carboxymethylcellulose Grafted Guar Gum (CMC-G-GG)

In 500 mL distilled water, 2.0g guar gum, 2.0g carboxymethylcellulose, and 2.0g ascorbic acid were mixed in a 1 litre flask. Preheat the flask for half an hour at 35°C. After 30 minutes, 1.5 gm potassium persulphate was added to the mixture, which was then allowed to settle for an hour. The mixture was made up to 500 mL in volume. After obtaining the corn starch grafted guar gum, the mixture was separated by placing it into a large flask containing DMF. The mixture was washed with DMF, filtered, dried, and weighed to determine the yield. Percent grafting of Guar gum was calculated using the following formula-

$$\% \text{ grafting} = \frac{W_1 - W_0}{W_0} \times 100$$

Where W_0

Where W_0 = weight of grafted gum and W_1 = weight of original gum.

$$\% \text{ grafting} = \frac{2 - 1.08}{1.08} \times 100$$

1.08

% grafting = 85.18%

The efficiency percentage of grafted Guar gum was calculated by the following formula-

$$\% \text{ efficiency} = \frac{W_1 - W_0}{W_2} \times 100$$

W_2

Where W_0 and W_1 are same as earlier and W_2 = weight of CMC used.

$$\% \text{ grafting} = \frac{2 - 1.08}{2} \times 100$$

2

% grafting = 46%

The grafting of CMC on Guar gum was 85.18% and the efficiency of grafted Guar is 46%.

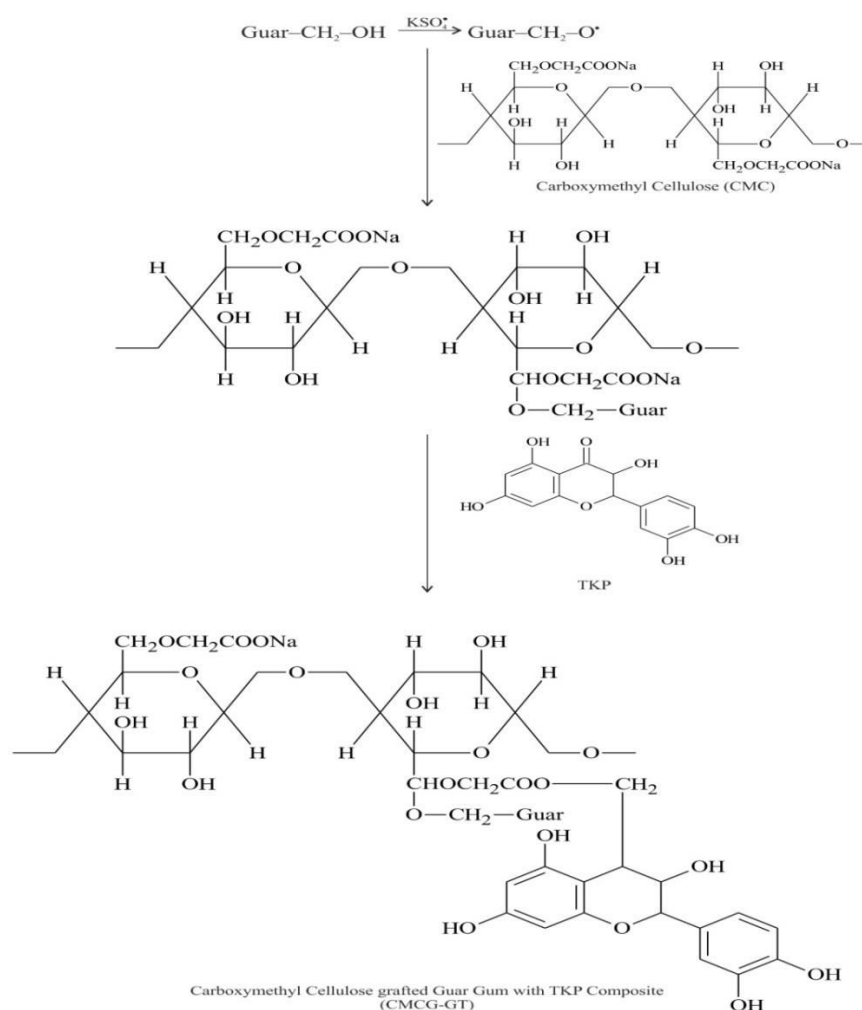
2.2.3 Saponification of CMC-G-GG

CMC-g-GG was saponified with an alkali (NaOH) solution. The grafted sample was dissolved in a 1% aqueous NaOH solution. The mixture was heated to 100°C for 1-2 hours before being precipitated in methanol, filtered, and washed with methanol and ethanol. The final product is dried at room temperature.

2.2.4 Preparation of CMCG-GT Composite Film

1gm saponified material was dissolved in 10ml distilled water in a flask. In a separate flask, TKP was dissolved in the required amount of ethanol. Both solutions were slowly stirred together in a flask. It is then treated with 5N ammonium hydroxide and stirred regularly for 15-18 hours at room temperature. The product is washed with distilled water many times. The excess solution should be evaporated on the thermostat from 20°C to 100°C until it becomes viscous. This viscous solution is spread evenly on a glass plate and allowed to dry for a few days at room temperature. On the glass plate, the dried CMCG-GT film is removed and studied.

2.2.5 Reaction Scheme for the Synthesis of CMCG-GT Composite Film



3. RESULTS AND DISCUSSION

3.1 Mass Analysis

At m/z 3732.54, the molecular ion peak was discovered. Peaks are produced by its daughter fragmentation at m/z 245.11, 301.15, 415.22, 437.20, and 590.42. The most prominent and stable stage of the newly created composite is the base peak observed at m/z 84.97. This explanation provides information on the CMCG-GT composite's successful synthesis.

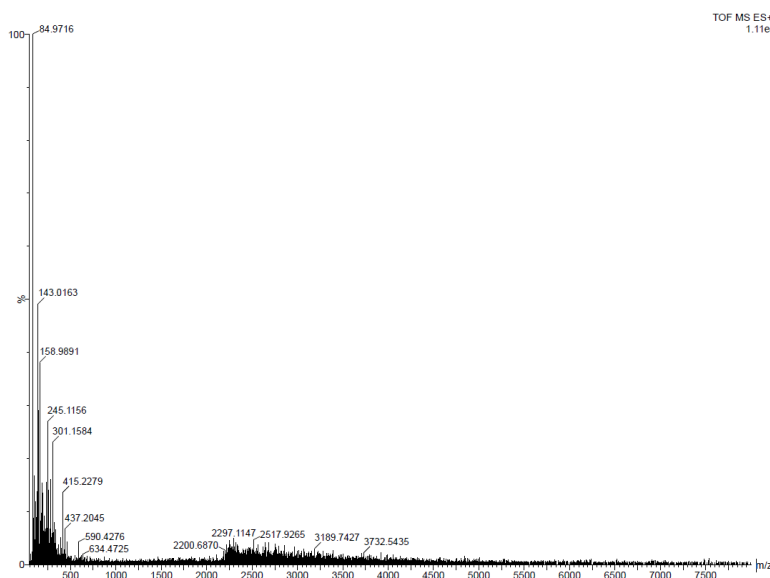


Fig 1: MASS spectra

3.2 FT-IR Analysis

The CMCG-GT composite was characterized using FT-IR analytical spectra. The picture depicts the assignment of several peaks detected in the FT-IR spectra of the newly synthesized composite. Because of $-O-H$ stretching, the peak at 3267.25 cm^{-1} is broad. This is the peak of guar gum, which serves as the polymer's backbone. The $C=O$ amide group has a peak of 1587.97 cm^{-1} . Because of the $C-H$ bond and the CH_2 aliphatic bending group, a 1317.37 cm^{-1} peak was observed. $O-H$ bending is responsible for the peak at 997.80 cm^{-1} , indicating the existence of a carboxylic group. 894.61 cm^{-1} peak was due to the presence of $C=C$, $C-H$ in a ring structure. The grafting and composite formation were visible in all of these distinct peaks.

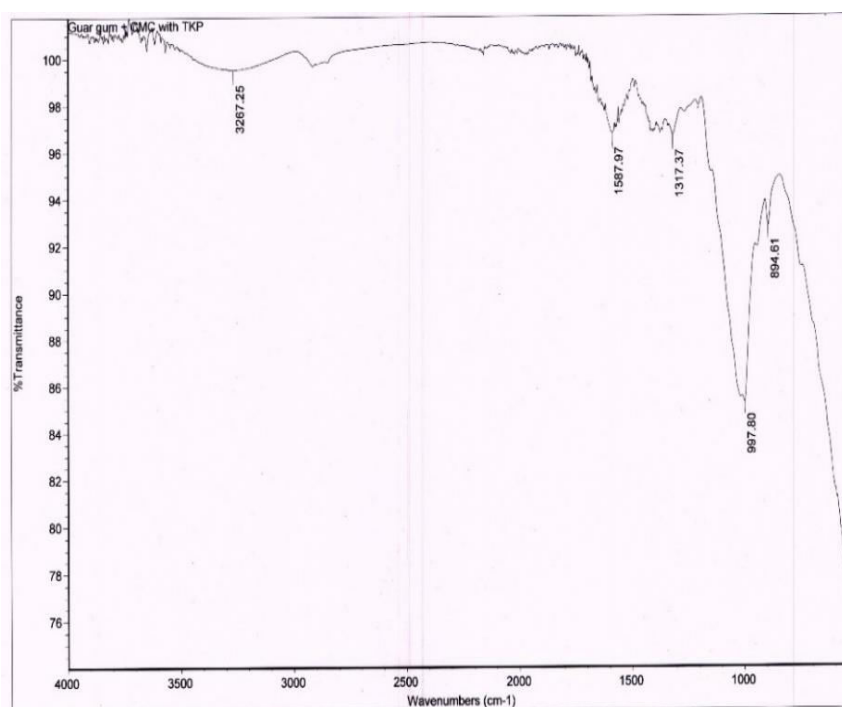


Fig 2: FT-IR Spectra

3.3 SEM Analysis

The surface morphology of the composite was studied using a scanning electron microscope (SEM). The SEM pictures at various magnifications are shown in the figure. The ZEISS instrument was used for the analysis. According to SEM analysis, the composite particles are consistent in size and dispersed across the entire surface area. The finished composite has a rough structure and a coarse, uneven surface.

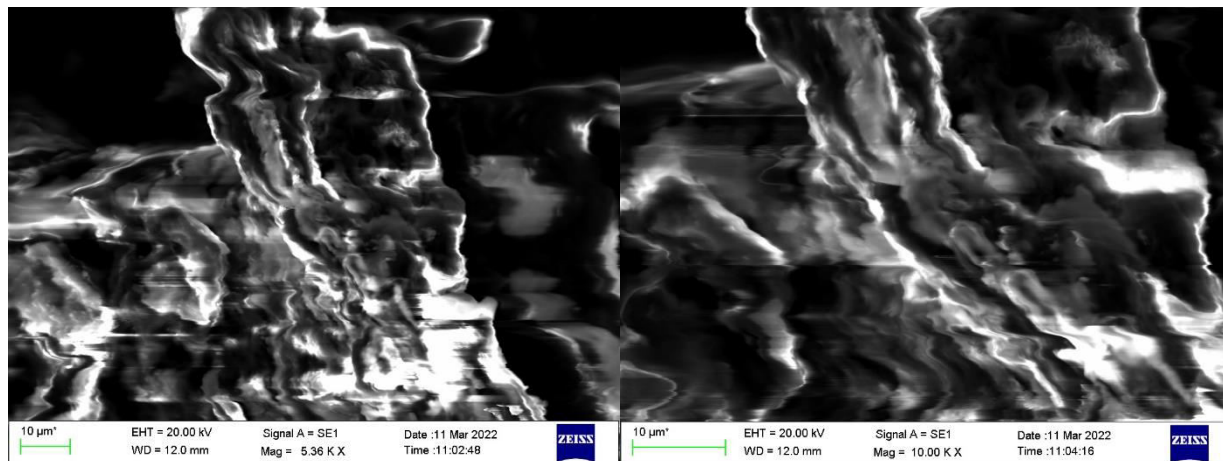


Fig 3: SEM Images

3.4 ¹H NMR Analysis

The ¹H NMR of the CMCG-GT composite was carried out to know the protonic environment. The sample was prepared in DMSO solvent. The peak at 7.0-8.0 ppm shows an aromatic group proton. The peak at 5.0-6.0 ppm shows an alkene group proton. The peak at 3.0-4.1 ppm shows carboxylic protons. The peak at 1.2-1.5 ppm confirms -CH₂ protons. The peak at 0.0-1.4 ppm confirms -CH₃ protons.

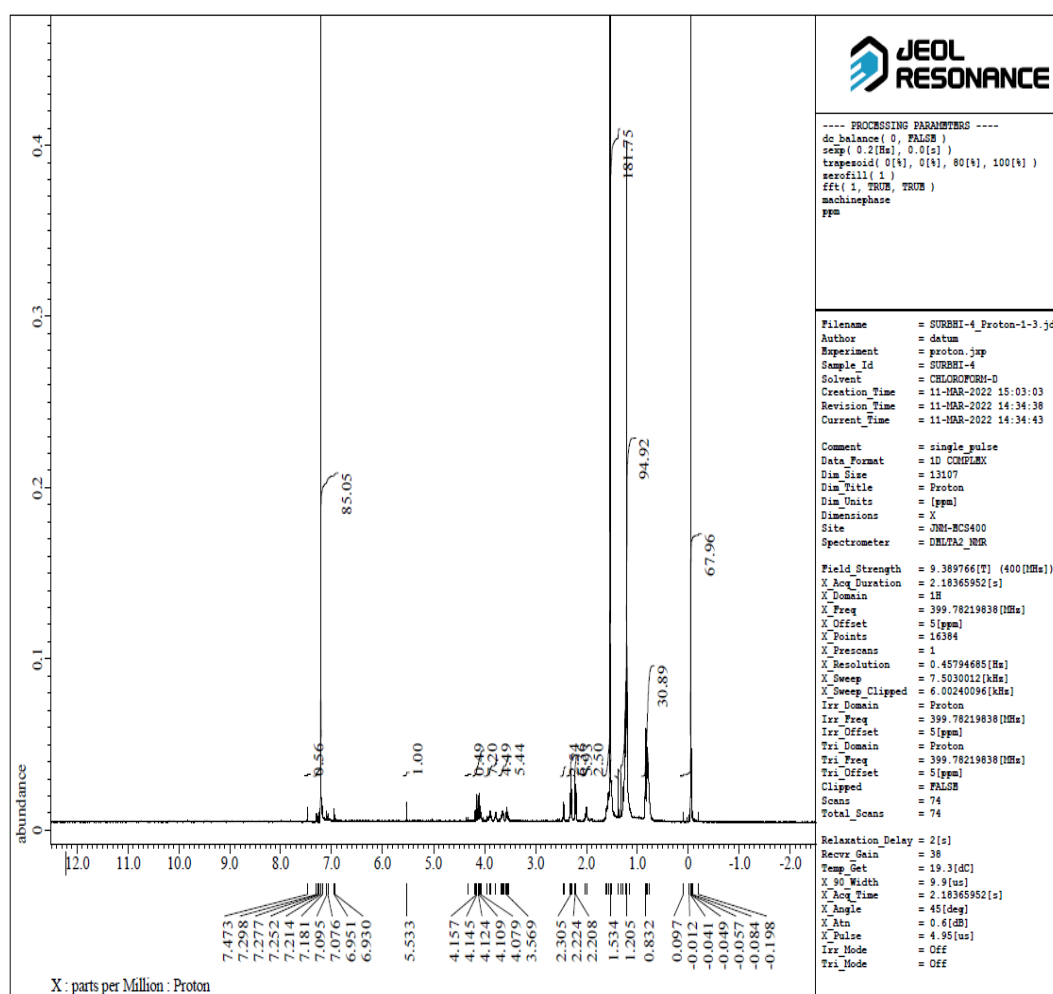


Fig 4: ¹H NMR Spectra

4. CONCLUSION

Mass spectra, FT-IR, SEM, and ^1H NMR were used to characterize the synthesized composite consisting of guar gum, carboxymethylcellulose and TKP. FT-IR spectroscopy was used to validate the grafting and functional groups were discovered through ^1H NMR. SEM was used to examine the composite's surface morphology. The manufactured composite can be utilized to determine binding capacity with metals and glass reinforcements, according to mass spectra.

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6. CONFLICT OF INTEREST

All authors approve the final manuscript and declare that there are no conflicts of interest.

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A Study on Consumer Perception towards Buying Fresh Produce through E-Commerce Platforms

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ABSTRACT

Today, consumers are increasingly turning online to buy different types of products including groceries. However, there are still hesitations to buy fresh produce such as meat, poultry and fish through e-commerce platforms. The online fresh produce market is distinctive in nature because the products are of perishable nature and are characterized with essential nutritional component that matters to the consumers. Due to these aspects, the fresh produce online market presents many challenges, from its production process to distribution to the final consumer. Lockdown happens to be a catalyst which helped in the increased penetration and reach of online platforms for fresh produce. This has definitely helped in the improved perception of people towards such platforms. The present paper is an attempt to study the attitude and perception of consumers towards buying Fresh Produce through E-Commerce Platforms.

Keywords: Consumer perception, fresh produce, e-commerce platform, online shopping

1. INTRODUCTION

E-Commerce is a vital component of emerging global economy. There are numerous businesses, from Global to local and from startups to well-established brands, offering their products through various E-Commerce platforms. Companies like Amazon, Alibaba, Myntra, Flipkart etc. are known names worldwide due to their Global presence, all thanks to e-commerce. Importantly, it also provides timely and convenient experience to consumers. There is plethora of product options available on these online markets. The product option includes almost everything like electronics, home-care, furniture, health care, groceries etc. This shows the expanse and coverage of e-commerce today.

E-commerce has taken into its gambit the direct sale of fresh products such as vegetables, fruits, meat, poultry, milk, aquatic products etc. Improved technology, penetration of internet, multiple electronic payment options, and effective distribution forms and the safety of contactless shopping has brought changes in the way of shopping to the majority of consumers, and this has resulted into integration of Fresh Produce through E-Commerce Platforms into people's life.

Although consumers are increasingly turning online to buy different types of products including groceries, there are still hesitations to buy fresh produce such as meat, poultry and fish through e-commerce platforms. The present paper is an attempt to study the attitude and perception of consumers towards buying Fresh Produce through E-Commerce Platforms.

2. REVIEW OF LITERATURE

- Xi Sun (2021)¹, in his research paper has introduced the four business models of fresh e-commerce and the alteration of circulation model of agricultural products. The study relates the circulation model of customary retail and fresh e-commerce. It also examines the features of intake demand of fresh e-commerce, and provides the improvement strategy of fresh e-commerce platform based on Retech.
- N. Meena Rani et al. (2019)², in their research paper analyses the consumers' buying pattern of fresh produce at organized retail stores from demographic perspective. The structure of analysis is broadly divided in two parts. First part deals with the impact of demographic factors (age, gender, income, education and marital status) on value of purchase and inclination towards organized retail stores. The second part focuses on the association between buyers' demographic traits, and perception concerning organized retailing of fresh produce in the framework of services marketing.
- Lau Teck Chai et al. (2019)³, in their research work tried to establish an integrated model that investigate the relationship of several antecedents (perceived ease of use, time saving orientation, convenience motivation and privacy and security) with the behavioral objective in the direction of Online Food Delivery services midst urban dwellers of Malaysia. The results showed affirmative effect of time saving orientation, convenience motivation and privacy and security towards behavioral intention of Online Food Delivery services. The findings provide substantial understandings about factors compelling urbanites to go for Online Food Delivery services.

- Durge Y. (2018)⁴, presented a case study on Pesca Fresh, a seafood delivery service in Mumbai. The research paper is an attempt to study seafood consumer's behavior in Mumbai. The paper attempts to collect insights into place, time of buying, preferred days of Purchase, and orders per month, maximum ordered products, and spends of seafood customers. The results of study will be helpful in understanding consumer's behavior towards seafood delivery services. This will further help in guiding choices relating to obtaining, warehousing, and dissemination, location of centers, marketing and promotions of such products.
- A.R. Azhar et. al. (2013)⁵, in their research studied Malaysian food retailing industry. The paper examined customers' satisfaction with fresh food attributes in Malaysian hypermarkets. The study reports that the majority of customers are satisfied with the overall quality of fresh food products. The research concludes that an understanding and prediction of customer needs is an important element for hypermarket operators and ensuring consumers' satisfaction, especially with regard to price.

3. OBJECTIVES OF THE STUDY

The specific objectives of present study are:

- To study the attitude and perception of consumers towards buying Fresh Produce through E-Commerce Platforms
- To suggest measures for improved penetration of E-Commerce Platforms for buying Fresh produce

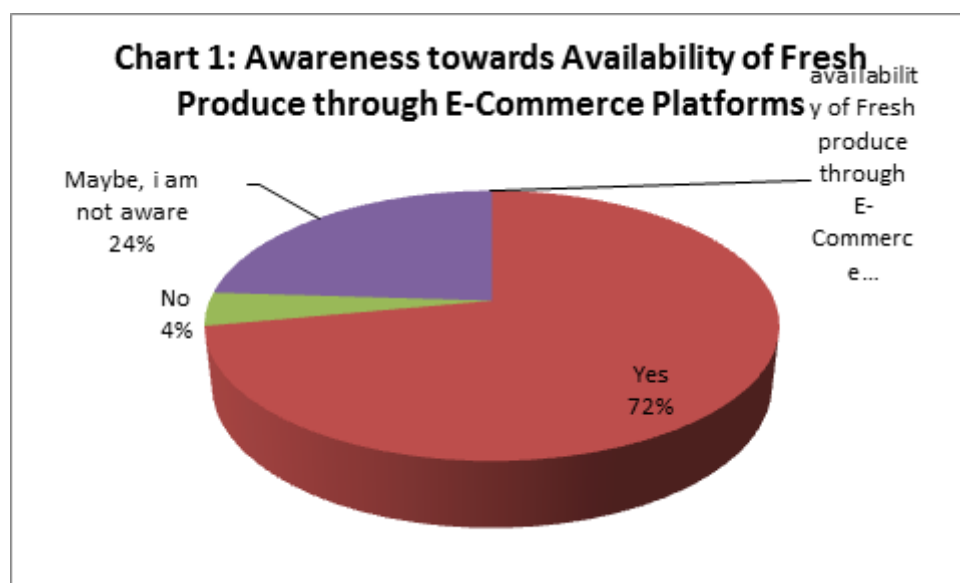
4. RESEARCH METHODOLOGY

The present paper has used both primary and secondary data. Primary data is collected with the help of structured questionnaire. The sample size for the study is 100 respondents from Greater Mumbai. Simple random and convenient method is used to collect the data. The study period is from January 2022 to March 2022. Frequency tabulation and Percentage method is used to analyze the data. Different secondary sources such as journals, newspaper articles, books and web resources are also extensively used to develop and execute the study.

5. FINDINGS AND ANALYSIS

The online fresh produce market is distinctive in nature because the products are of perishable nature and are characterized with essential nutritional component that matters to the consumers. Due to these aspects, the fresh produce online market presents many challenges, from its production process to distribution to the final consumer. The pandemic Covid-19 gave an impetus to e-tailing due to subsequent lockdown. Many people started using different E-Commerce platforms to fulfill their daily needs and requirements. This surged the demand for online platforms offering fresh produce also. However, after the lockdown is lifted by the government there is a decline in the demand of these online portals.

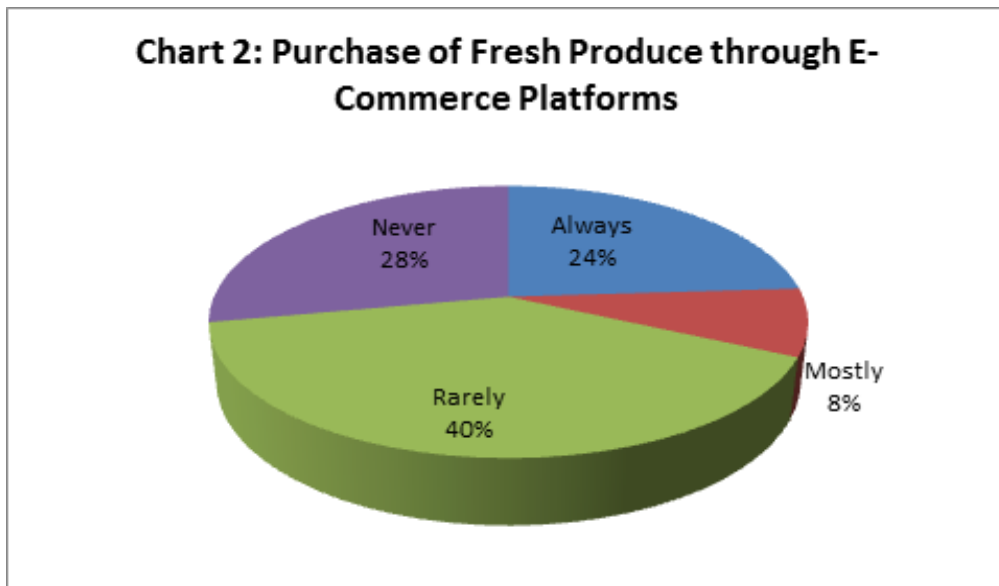
A primary survey was conducted in Greater Mumbai, to understand the attitude and perception of consumers towards online platforms offering fresh produce. The study first enquired about the awareness towards availability of fresh produce through online platforms in the study area. The results are displayed in Chart 1.



Source: Compiled from Primary survey data

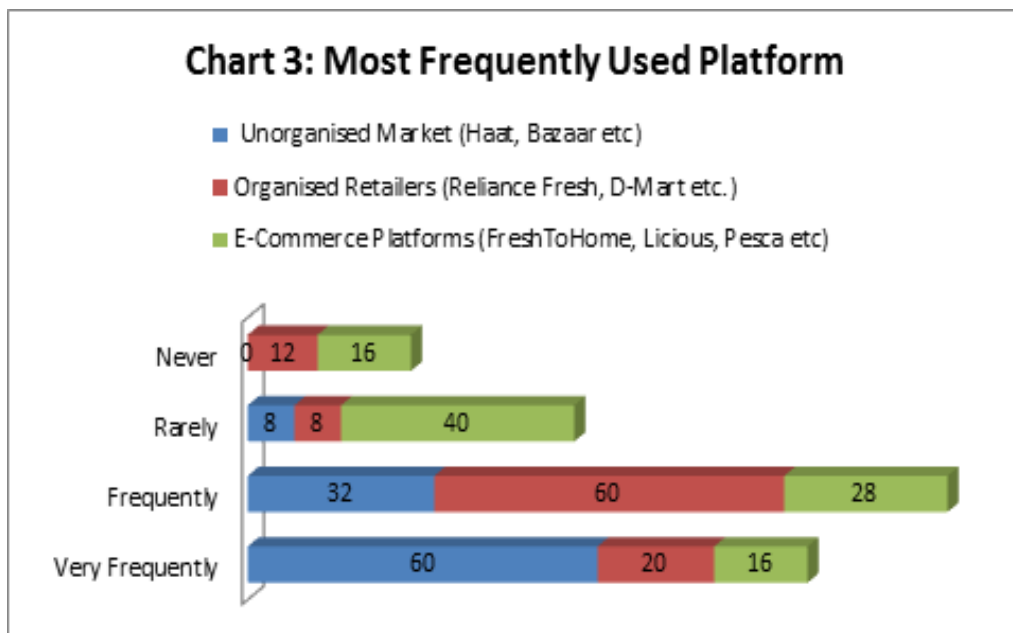
The result shows that there is good awareness about different E-Commerce platforms available for fresh produce in the study area. A majority, that is, 72 percent of the respondents are aware about the availability of such portals. However, 28 percent of the respondents are not aware about such platforms.

The respondents were then asked whether they buy fresh produce through online portals. Their responses are exhibited in Chart 2.



Source: Compiled from Primary survey data

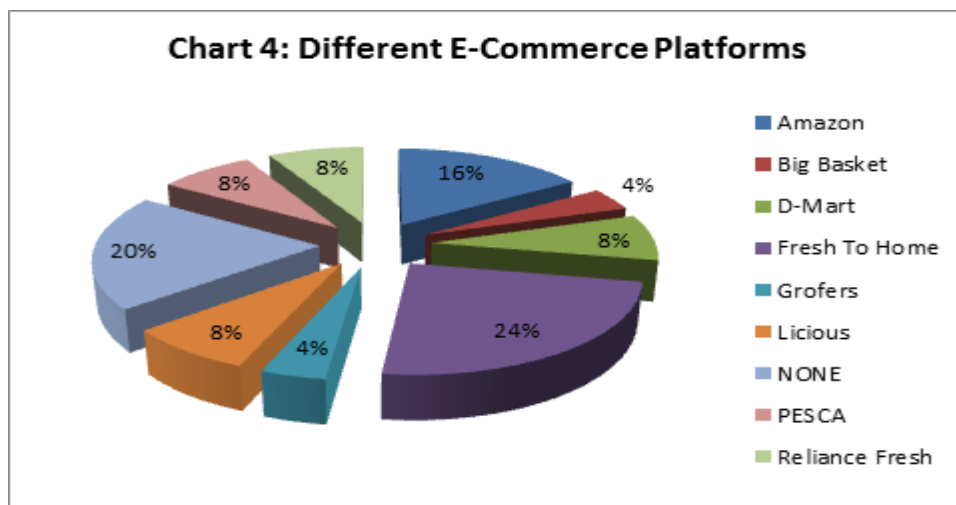
It was found that only 24 percent of the respondents always use E-Commerce platforms for purchase of fresh produce. Whereas, 28 percent of the respondents say they never use these platforms and a big 40 percent say they use these platforms rarely for purchase of fresh produce. This clearly shows that majority of population, for fresh produce, does not use E-Commerce platform. The respondents were then asked about the most frequently used platform for buying fresh produce such as vegetables and meat. The responses are summarized in Chart 3.



Source: Compiled from Primary survey data

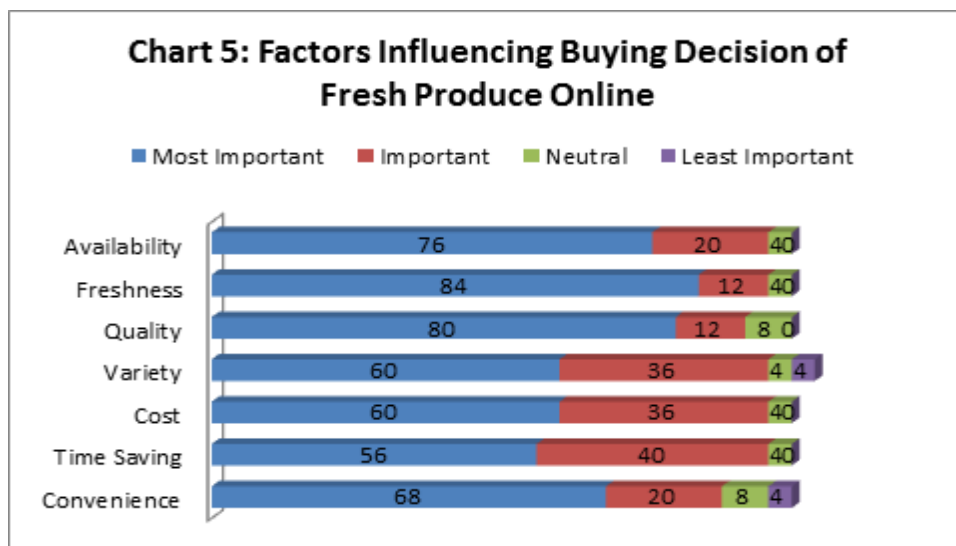
The result for E-Commerce platforms shows that 16 percent of the respondents very frequently use these platforms and 28 percent use it frequently but a major 40 percent use it rarely and 16 percent of the respondents do not use online platforms at all. The most popular and frequently used platform for fresh produces is unorganized retail markets with 60 and 32 percent of the respondents using it very frequently and frequently respectively.

The study further enquired about the popularity and use of different E-Commerce platforms available in the market in the form of open ended question. The results are exhibited in Chart 4.



Source: Compiled from Primary survey data

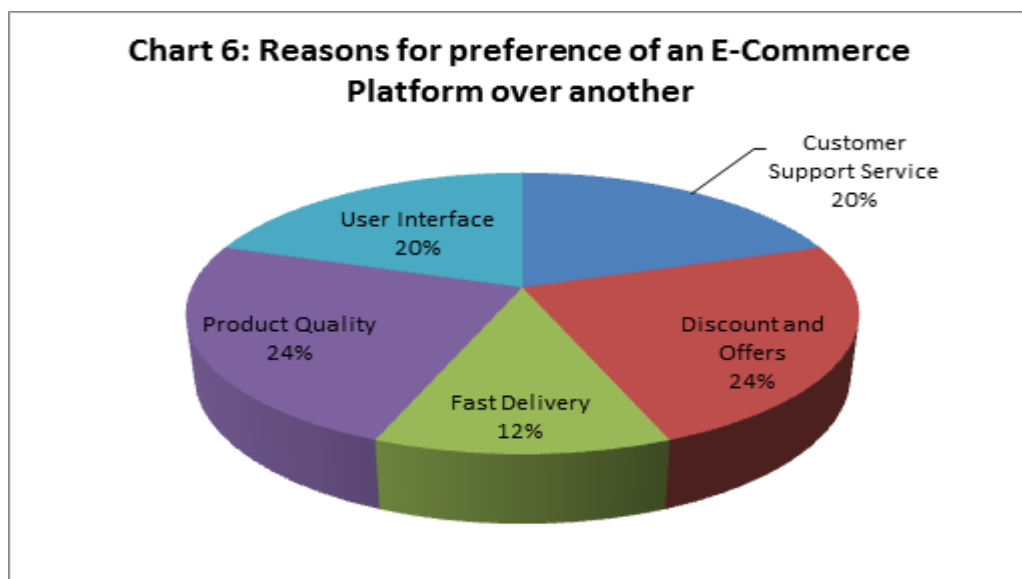
It was found that 24 percent of the respondents use Fresh to Home platform to buy fresh produce followed by Amazon with 16 percent response. Other E-Commerce platforms marked by the respondents were D-Mart, Licious, PESCA, Reliance Fresh, Big Basket and Grofers. However, 20 percent of the respondents replied none. The results clearly show that respondents are buying fresh produce from different E-Commerce platforms. Only 'Fresh To Home' and 'Amazon' are able to make place in the market other E-Commerce players need to work on their marketing strategy to make a place in Mumbai Market for fresh produce. The study further enquired about the influence of different factors on buying fresh produce online. The respondents were asked to rate the different parameters influencing buying decision of fresh produce online on a four point scale. The results are presented in Chart 5.



Source: Compiled from Primary survey data

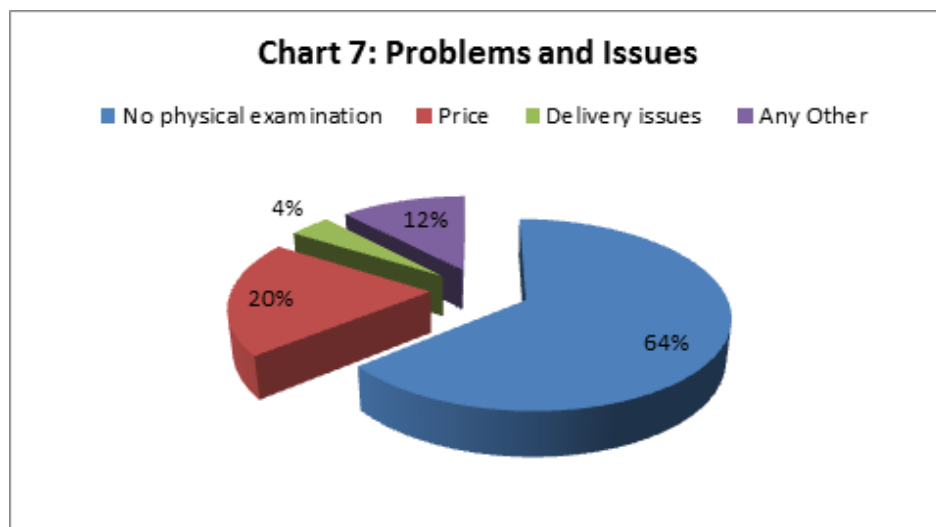
The first factor was availability, 76 percent of the respondents rated it as most important while 20 percent found it important. Freshness of the product was rated as most important factor influencing buying decision of fresh produce online by 84 percent of the respondents. The survey result further show that, quality of fresh produce is most important for 80 percent of the respondents. Other factors like variety and cost were rated as most important by 60 percent while 36 percent marked it as important. Convenience was rated by 68 percent of the respondents as most important. Time saving was rated as most important by 56 percent of the respondents followed by 40 percent rating it as important while for others it is immaterial. It was found that all the parameters used in the study is important for the consumers and therefore has same influence on the buying decision of fresh online produce.

There are several factors which influence a consumer's decision to choose one digital platform over the other. Some of them are good range of products, economic pricing, timely delivery, brand name, modes of payments etc. The study enquired on some such factors that are determining while selecting a digital platform. The results are summarized in Chart 6.



Source: Compiled from Primary survey data

Discounts and offers are one of the reasons which highly impact a consumer's decision. The Chart 6 shows that almost 24 percent of people consider the discounts before making a purchase decision on an app., while 24 percent look for quality before buying the product online. Similarly for 20 percent of the respondents' user interface is the determining factor while other 20 percent looks for a good customer support service in place. However, only 12 percent of the respondents rated as fast delivery as the determining factor.



Source: Compiled from Primary survey data

Chart 7 shows that 64 percent of the respondents have issues related to physical examination of product in online mode. The fact that they cannot see the vegetables or meat themselves and are dependent upon the third party for the same makes them doubtful. High product price is market as a problem by 20 percent of the respondents. Other issues which are faced by the consumers are delivery issues, complaint redress, mode of payments etc.

6. SUGGESTIONS

Some suggestions to overcome the challenges of online fresh produce market-

- As fresh produces are very perishable in nature, they require effective supply chain management with cold storages and effective transportation. E-vendors, therefore, need to improve the handling and logistics by the use of improved technology and staff training.

- Promotions should be used effectively to fill the communication gaps. E-vendors can ease customer fears by encouraging word-of-mouth recommendations, providing information by advertising and publicity about product freshness and quality, and offering bargains to encourage online purchases.
- To address to consumer hesitation and improve sales, online retailers can provide in-depth product information. Customers' reviews should be used to convey quality and build trust.
- Recommendations from family and friends are more convincing and trustworthy; this can be encouraged by providing discounts or deals to those who refer friends or family to their site.
- Sampling should be used as a tool to promote for products that buyers might not otherwise order online.
- In order to ensure consistency in services, strict quality control and total quality management should be ensured.
- Indian population is price conscious, it is therefore important for e-vendors to apply strategic management to provide customers value for money. This can be achieved by providing value packaging, free coupons, points redemption for loyal customers, discounts etc.

7. CONCLUSION

The study shows that many people purchase fresh produce through online platforms. However, there are issues, challenges and hitches in adapting to this mode and a larger chunk still believes in the traditional methods of buying fresh produce. The reason for this is the typicality of fresh produce that requires immediate consumption. Lockdown happens to be a catalyst which helped in the increased penetration and reach of online platforms for fresh produce. This has definitely helped in the improved perception of people towards such platforms. However, for long run survival, improvisation is required in the overall functioning and approach of online platforms for fresh produce.

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An Effective Movie Recommendation System Using Collaborative Filtering and User Review Sentimental Analysis

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ABSTRACT

In the present advanced world, a suggestion/recommendation engine is quite possibly the most incredible asset for showcasing. A recommender system is only a data separating system made out of machine learning algorithms that foresee a given client's evaluations or inclinations for a thing. A proposal engine assists with tending to the test of data over-burden in the internet business space. Accordingly, it can help in saving a ton of perusing time for clients, as the recommendation system guides the client to results of the things which he is destined to like. Its customized highlights improve client commitment and maintenance. The possibility of proposal engine is likewise something you are as of now acquainted with; whether it is item suggestions on Amazon, film suggestions on Netflix, or music ideas on YouTube, recommender frameworks are now supporting numerous parts of your experience on the web.

Keywords: *Recommendation Systems, Cosine Similarity, Content-Based Filtering; Sentiment Analysis, Naive Bayes Algorithm, Collaborative Filtering, Movie User Feedback*

1. INTRODUCTION

The recommendation system is essential for routine life where individuals depend on information for choosing their inclinations. The Collaborative filtering [1] model takes information from a client's past conduct (i.e., recently bought things or picks or ratings/appraisals given to the things) just as comparable choices made by different clients. From that point onward, various models are used to conjecture things (or evaluations for things) that the client may have an interest in. Despite the fact that there are many drawn closer created before. In any case, search actually goes on because of its frequently utilized in numerous applications, which customize suggestions and manage an absence of precision. These requests toss a few difficulties. To address this, numerous specialists have utilized calculations like Alternating Least Squares, Singular Value deterioration, K-Nearest Neighbor calculation, and Normal indicator calculation. Collaborative filtering (CF) techniques partitioned into memory-based and model-based strategies. Memory-put together strategies make a move just with respect to a client thing rating matrix and can without much of a stretch be acclimated to utilize all the evaluations before the filtering strategy; along these lines, its outcomes are refreshed/updated [2]. On the other hand, a model-based framework, similar to a neural network, creates a model that gains from the data of client thing evaluations and suggests new things. It shows the nitty gritty depiction (essential and basic) of all the above approaches. The recommender system actually expects improvement to build up a superior and precise technique. The recommendation system is a sharp system that gives thoughts regarding the thing to clients that may intrigue them. In this paper, we have evaluated the effectiveness of the model along with encouraging results.

2. RELATED WORKS

Film/movie recommendation systems utilizing a few strategies have been widely concentrated in the previous many years [3].

Models incorporate a movie recommendation system utilizing the ALS algorithm, a recommendation based on the weighting procedure, thing likeness-based collaborative filtering. These methods need earlier data about the ratings for the films which are produced by the client. These procedures significantly use movie lens [4]

datasets for assessment purposes. Notwithstanding, these systems are not somewhat exact, and research is progressing to improve the continuous exhibition of these systems. Microblogging also used the recommendation system in past surveys [5].

3. OBJECTIVE

The objective of our recommender system is to make significant recommendations to an assortment of clients for things or items that they might like. Recommender systems are broadly utilized in a few distinct spaces for the proposal of articles, music, films, and even individuals. A benefit of recommender systems is that they are customized to clients of internet business [6], elevating balanced advertising and digital India [7]. Amazon, a pioneer in the utilization of collaborative recommender systems, offers "a customized store for each client" as a component of their advertising system. Hence, Movie recommendation systems provide a mechanism to help clients in grouping clients with similar/comparative interests. Few researches conducted on medical science to early-stage detection of diabetes and recommend the treatment [10].

4. OUR METHOD

This paper elaborately discusses two supervised machine learning algorithms: K-Nearest Neighbor (K-NN) (explain in detail in 6) and cosine distance metrics (explain detail in 7) which we have used for item-based collaborative filtering (explain in detail in 5.2) and Naive Bayes algorithm for sentiment analysis (explain in detail in 8) to figure out whether reviews are negative or positive and based on those compares their overall accuracy.

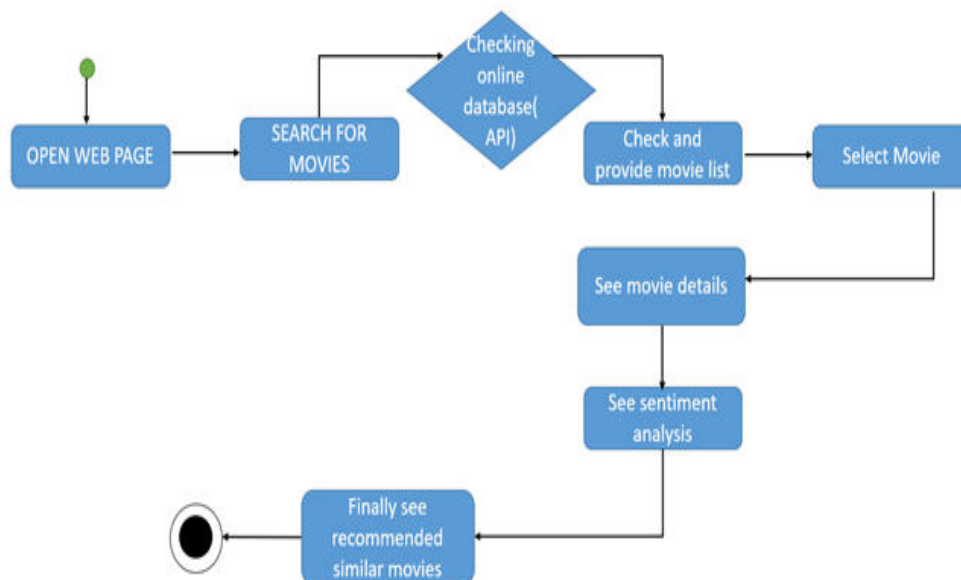


Fig. 1: Engineering of Movie Recommendation System

ARCHITECTURE

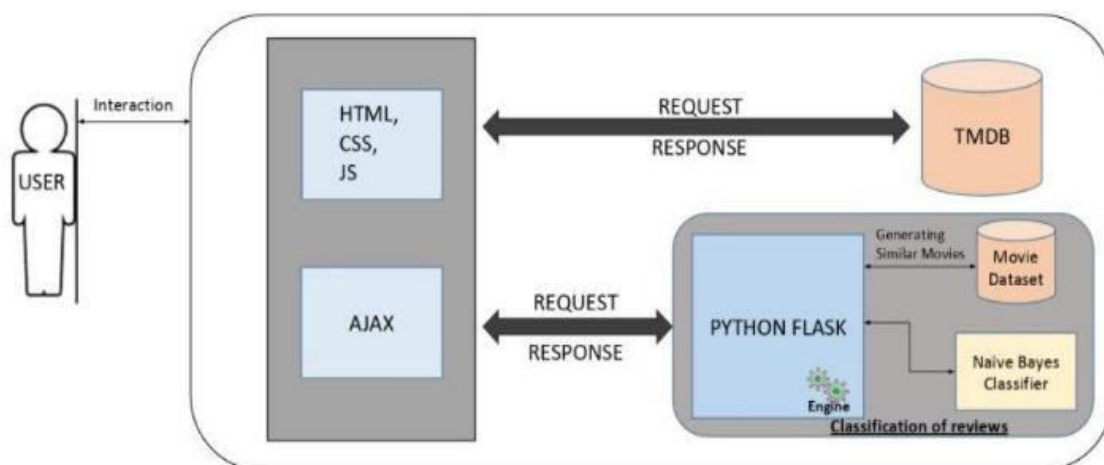


Fig. 2: Architecture of Movie Recommendation System

4.1. Dataset

This data set (ml-most recent little) portrays 5-star rating and free-text labelling movement from Movie Lens, a film suggestion administration. It contains 100836 evaluations and 3683 label applications across 9742 motion pictures. This information was made by 610 clients. Clients were chosen indiscriminately for consideration. All chosen clients had evaluated in any event 20 films. No segment data is incorporated. Every client is addressed by an id, and no other data is given.

The data are contained in the two files movies.csv and ratings.csv [16].

4.1.1. Movie Dataset (Movie.Csv)-

Movie Id – when the recommendation is done, we get a rundown of every comparable movie and get the title for every movie from this data set.

Genres – this field isn't utilized in our filtering approach.

4.1.2. Ratings Dataset (Ratings.Csv)-

User Id – extraordinary for every client.

Movie Id – utilizing this feature/quality, we take the name of the movie from the data set of movies. This is the same/common field between both the datasets.

Rating – Ratings given by individual users to different movies, utilizing this we are going to forecast the top ten corresponding movies.

4.1.3. Review's Dataset Has (Imbd_Master.Csv)-

The data set contains text movie reviews with positive and negative qualities, which will be used for sentiment analysis. We have carried out item-based movie recommendations. For item-based proposals in the paper, we have utilized the ratings of those movies that are profoundly like the rating of the film, which is given by a legitimate client from utilizing the thing's similitude loads. In addition, prescribe these films to the particular client by picking the K nearest items with higher ratings.

5. TYPES OF RECOMMENDER SYSTEMS

As shown in Fig.3. Recommendation engines can be divided into 2 types:

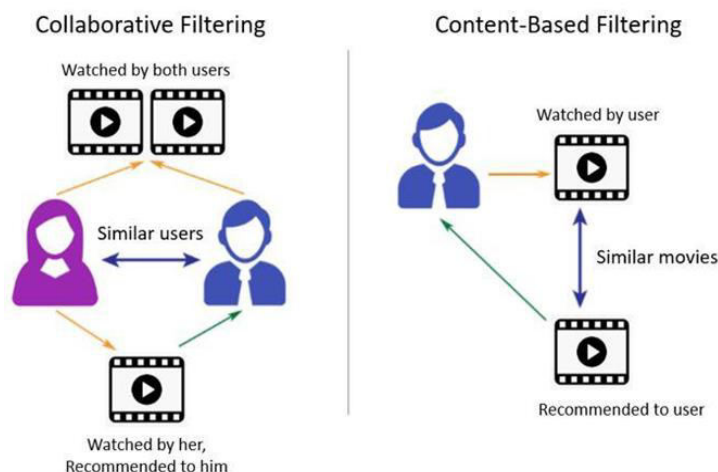


Fig. 3: Types of Recommender Systems

5.1. Collaborative Filtering

This filtration procedure depends on the combination of the client's/user's department and then it compares it with another user's department in the database. The historical backdrop of all clients assumes a significant part in this calculation. The major contrast between content-based filtering and collaborative based filtering is that, the collaboration of all clients with the items impacts the recommendation calculation while for content-based filtering it just takes user's data into consideration. There are numerous approaches to execute collaborative based filtering however the major idea is that, in collaborative filtering several different client's data impact the result of the recommendation and furthermore it does not only rely upon just one client's data for modelling. There are two types of collaborative filtering algorithms:

5.1.1. User-Based Collaborative Filtering

The essential thought here is to discover clients that have comparable past inclination designs as the client 'A' has had and afterward suggesting the person in question things preferred by those comparable clients which 'A' has not experienced at this point. This is accomplished by making a network of things every client has appraised/saw/preferred/clicked relying on the main job, and afterward processing the closeness score between the clients lastly suggesting things that the concerned client doesn't know about however clients like him/her are and enjoyed it.

For instance, if the client 'A' likes 'Batman Starts', 'Equity Group' and 'The Vindicators' while the client 'B' likes 'Batman Starts', 'Equity Association' and 'Thor' at that point they have comparative interests since we realize that these motion pictures have a place with the hero class. Along these lines, there is a high possibility/probability that the client 'A' might want 'Thor' and the client 'B' might want 'The Vindicators'.

5.1.2. Item Based Collaborative Filtering

The basic concept for item-based collaborative filtering is to find corresponding movies rather than corresponding users and then suggesting corresponding movies to that 'A' has had in their previous liking. This is executed by discovering each pair of items that were evaluated by a similar client, at that point estimating the closeness of those appraised/rated/watched across all the clients who appraised/watch/rated both, and lastly suggest them based on correspondence scores.

Here, to illustrate, we take 2 movies 'A' and 'B' and check their ranking by all those clients who have rated both the movies and based on the correspondence of those ratings, and based on that rating comparability by those clients who have rated the two of them, we discover corresponding movies. In this way, if most of the clients have appraised two of them i.e. 'A' and 'B' then there are high chances that 'A' and 'B' are corresponding to each other; hence it is possible that if someone has seen and liked movie 'A' then they should also like movie 'B' and vice versa.

5.1.3. Content- Based Filtering

Content based filtering technique is based on the data/information given about the item. The calculation suggests items that are corresponding to the ones that a client has enjoyed previously. This likeness (by and large cosine closeness) is figured from the information we have about the things just as the client's previous inclinations [4].

To illustrate, assuming that client/user likes movie, which is have genre thriller then we can suggest the movie of the same genre or the movie which is directed by the same director .So, what occurs here the proposal framework checks the previous inclinations of the client and discover the movie "The Notoriety", at that point attempts to discover comparable motion pictures to that utilizing the data accessible in the data set like the lead entertainers, the chief, sort of the film, creation house, and so on and dependent on this data discover motion pictures like "The Distinction".

6. KNN ALGORITHM

The k-nearest neighbour (KNN) algorithm is an easy and simple to-carry out, supervised machine learning can handle two of them i.e., regression and classification problems. The KNN algorithm looks forward to the comparative items existing in nearness. All in all, comparable things are close to one another.

Example

Coming up next is a guide to comprehend the idea of what K is and the working of KNN algorithm– Assume that we have a data set which can be plotted as shown below in the diagram.

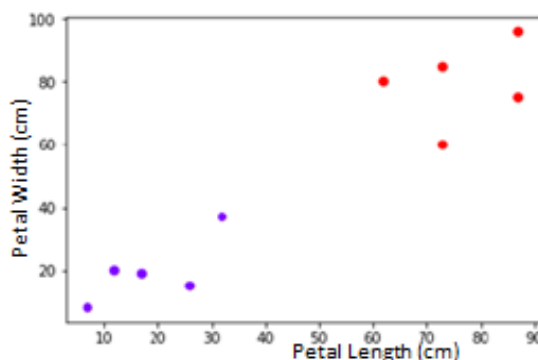


Fig. 4: KNN Data Points

Now, we have to classify new data points at (60,60). let's take the value of $K = 3$ and it will discover the three nearest data points as shown in below diagram.

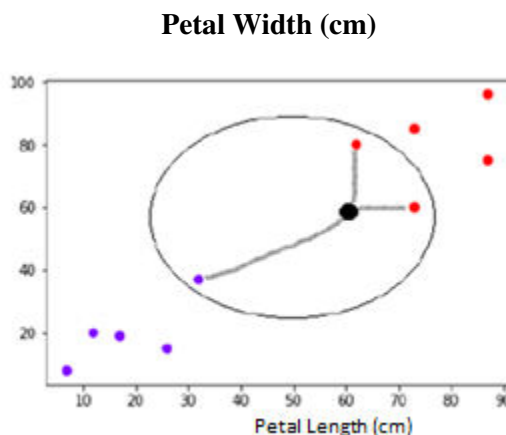


Fig. 5: KNN Centroid Calculation

As we can notice in the above (diagram 2) the 3 points which are nearest neighbours of the data point with black dot. Among those three points, two points are in the red class and one point belongs to the blue class and therefore, the black dot will be assigned to the red class.

To execute an item based Collaborative filtering, KNN is an ideal go-to show and furthermore an awesome benchmark for recommender system improvement. KNN is a non-parametric, lazy learning strategy. It utilizes an information base in which the information focuses are isolated into a few bunches to make deductions for new examples. KNN doesn't make any suppositions on the fundamental information appropriation however it depends on item feature likeness. At the point when KNN makes a deduction about a movie, KNN will compute the "distance" between the objective movie and each and every movie in its data set, at that point it positions its distances and returns the top K closest neighbour motion pictures as the most comparable film suggestions.

7. COSINE SIMILARITY

Cosine similarity could be a measure of similarity which will be accustomed to compare documents or, say, provide a ranking of documents with relation to a given vector of question words. Let's suppose a and b be 2 vectors which we will compare [9].

The cosine similarity equation to solve the equation of two vectors a and b so the dot product or the $\cos\theta$ is:

$$\vec{a} \cdot \vec{b} = \|\vec{a}\| \|\vec{b}\| \cos \theta \quad (1) \qquad \cos\theta = \frac{\vec{a} \cdot \vec{b}}{\|\vec{a}\| \|\vec{b}\|} \quad (2)$$

Furthermore, cosine similarity can produce a metric that says how related are 2 different records by watching the angle between them rather than magnitude, as you can see in Fig.6.

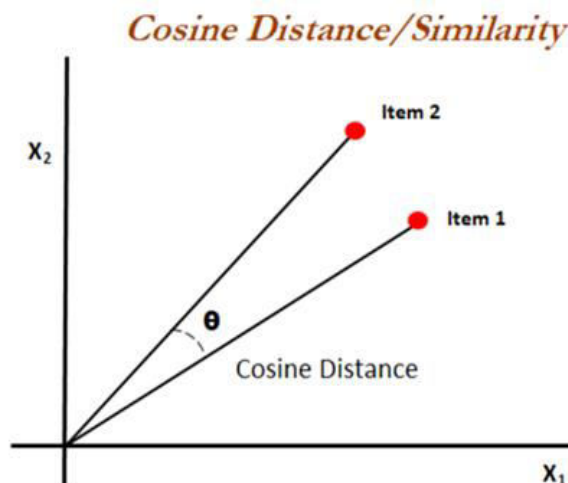


Fig. 6: The Cosine Similarity values for various documents

Let's say we've got two vectors. If the vectors are parallel or close to parallel, i.e., angle between the vectors is zero, then we can say that each of them is similar, as $\cos(0) = 1$. Whereas if the vectors are unit orthogonal, then we will say that they're not similar, as $\cos(90) = 0$.

8. SENTIMENT ANALYSIS USING NAIVE BAYES ALGORITHM

Sentiment analysis is now an important instrument for monitoring and understanding consumer review as they share their opinions and emotions more freely than ever before. Sentiment analysis is a theory that examines how to derive subjective emotions and feelings from text. Sentiment analysis is often used to determine whether a text expresses negative or positive emotions. Since written reviews often include a score that can be used to train an algorithm, they make excellent datasets for sentiment analysis.

Naive Bayes methods are a set of supervised learning algorithms based on applying Bayes Theorem with the "naive" assumption of conditional independence between every pair of features given the value of the class variable. It finds the probability of another event that has already occurred. Bayes' theorem states the following relationship/equation:

$$P(A/B) = (P(A/B) P(A)) / (P(B)) \quad (3)$$

Using sentiment analysis to evaluate 4,000+ feedback for movies instantly will help us to figure out whether consumers are satisfied with about movies or not. So here in our model, probabilities are unimportant to us. Everything we care about is whether a text has a positive or negative tone.

Table 1: Example using naive bayes algorithm is stated below:

Set	Document	Review Sentence	Class
Training set	1	I loved the movie	positive
Training set	2	It's a good movie I liked the story	positive
Training set	3	Songs were nice but boring ending	negative
TEST SET	4	I liked the story but it was boring location. Overall, the movie was good	positive

9. CONFUSION MATRIX AND ACCURACY

		Predicted Class	
		Negative	Positive
Observed Class	Negative	2937 (TN)	38 (FN)
	Positive	12 (FP)	3931 (TP)

Fig. 7: Confusion Matrix

Accuracy of sentiment analysis on user reviews:

$$\begin{aligned} \text{ACCURACY} &= (TN + TP) / (TN + TP + FN + FP) \\ &= (2937 + 3931) / (2937 + 3931 + 38 + 12) \\ &= (6868) / 6918 \\ &= 0.992 \text{ i.e.,} \end{aligned}$$

Our accuracy which is approximately 99.2%.

10. RMSE (ROOT MEAN SQUARE ERROR)

For the evolution purpose Root Mean Squared Error (RMSE) was used and RMSE for sentiment analysis on user reviews. RMSE=0.90 i.e., our root means square error which is approximately 90.0%.

11. CONCLUSION & FUTURE WORK

Recommendation systems now-a-days is considered vital in E-commerce on the web for consumers to recommend the items or product that they might like/interested in using. As the number of users/consumers and products/items has increased in the past few decades, the use of recommendation systems is even more. But the recommendation systems also face two major challenges:

1) data sparsity and 2) data scalability issues, which result in low prediction quality and inefficient time utilization. In this research paper, we have proposed an integrated approach using item based collaborative filtering that utilizes dimension decrease to improve prediction accuracy and recommendation proficiency and Sentiment analysis to evaluate the review. We have taken reference from the existing work on it [14] [15]. It centres around traditional and corresponding objects to compute similarity between them and predict the most corresponding movies to users by reducing the noise of dimensional data. In contrast to conventional content-based filtering approaches, the experimental results indicate that this method has a significant effect on providing improved prediction accuracy and a much faster execution time. Sentiment analysis provides insight about how a movie's viewer reacts, and this information has been shown to be helpful. Its outcomes ameliorate the quality of recommendation system utilizing collaborative filtration technique and sentiment analysis. Item-based collaborative filtering techniques and Naive Bayes Algorithm produce recommendations that are simple to execute. It is preferable to use an item-based approach, if the number of users exceeds the number of items. With further more features you are able to conduct this in the field. As there is increasing demand for Recommend-er Systems as new technologies grow and need to improve their performance.

We have successfully implemented KNN algorithm and to calculate similarity we have used cosine distance metric in python using pandas, NumPy, sklearn, seaborn, matplotlib libraries. Further, we will implement different algorithms like tanimoto, Pearson coefficient, Slope one, SVD recommendation. Blockchain based solution [11] can be applied to secure the generated recommendation which cannot be manipulated for increasing the business and some un authorized means [12].

12. Limitation of Collaborative Filtering

1. Cold Start: Collaborative Filtering systems frequently necessitate a large amount of pre-existing data from which the user may make precise recommendations.
2. Scalability: CF produces recommendations for a variety of situations involving billions of consumers and products. As a result, a large amount of computing power is frequently required to compute recommendations.
3. Sparsity: The quantity of things sold on major e-commerce sites is tremendous. As a result, most active users only rate a small portion of the overall database. As a result, the most popular things receive extremely few ratings.

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Comprehensive Standardisation of Ayurvedic Complex Guggul Formulations by Modern Analytical Guidelines

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ABSTRACT

Ayurveda, means “SCIENCE OF LIFE”, the ancient medicinal system of the Indian subcontinent. The current public interest in Ayurveda medicinal system has been increased over the other conventional medicinal system. The present studies aimed to develop a quality profile about the different formulations of crude drugs such as Triphala guggul and kaishore guggul being currently used in the market. The formulations of Triphala guggul and kaishore guggul were prepared by extracting crude drugs in the solvent separately. Gallic acid is a strong antioxidant that possesses wide range of applications, which was used to standardize these formulations and confirmed through HPTLC. The study involved the comparative study of gallic acid in the prepared formulation. The percent amount of gallic acid was found to be 0.54%, 0.61%, 0.59% and 0.63% in Triphala kwatha, Triphalaguggulkalpa gutikas, Kaishore guggul tablets, Kaishore guggulu pills respectively, concluded that the kaishore guggul pills is the good source of gallic acid. The detailed pharmaceutical and analytical study has confirmed the authenticity and quality of the prepared formulations. The study concluded that routine analysis of drugs and formulations can be carried out using the same method.

Keywords: Ayurveda medicinal system, Triphala guggul, kaishore guggul, gallic acid, HPTLC

1. INTRODUCTION

The oldest traditional medicinal system in India is Ayurveda [1]. Ancient writings such as the Vedas, Samhitas, and Puranas provide information on the healing powers of plants and preparations utilised in Ayurvedic treatments, as well as specifics on their characteristics and medicinal values. There are number of plants and parts which are used in modern medicine with reference to ayurvedic literature.

The extensive use of medicinal plants has been recorded in wide parts of world in different forms. Thus, has led to a decline in quality and efficiency of medicines. Thus, to keep a circulation of authentic natural medicines in the market, there is an urgent need for accurate and updated data on the characteristics, applications, efficacy, safety, and quality of medicinal plant products. [2].

Guggulu is a popular herb classified as tridosha har in Ayurveda medicinal classification which cures various diseases. Due to its therapeutic properties, it is used for centuries to treat a range of ailments. History revealed that guggulu has prime place in Atharva Veda [3].

Guggulu always formulated with other ingredients in formulation-based concept in Ayurveda. Guggulu is utilized to prepare many Ayurvedic formulations in Ayurvedic System of Medicines [4].

An essential ancient medicinal plant is Guggul (*Commiphora wightii* (Arn.) Bhandari) or *Commiphora mukul* Engl. (*Burseraceae*). Guggul is the name given to the yellow colour resin produced by its stem of the plant *Commiphora wightii* [5]

Guggulu possess astringent, antiseptic, expectorant, aphrodisiac, carminative, anti-spasmodic, emmenagogue properties and the finest among herbs helps to cure Medoroga and Vata diseases. Obesity is also treated by using this herb since it helps to decrease cholesterol and triglycerides levels. Rheumatoid arthritis, gout, and sciatica are all treated by guggulu. Because of its incredible healing potential, it is utilised in nearly every type of sickness [6].

1.1 Different types of Gugguls

Yogaraj guggulu, Punarnavadi guggulu, Kanchanar guggulu, Gokshuradi guggulu, Simhanad guggulu, Triphala guggulu, Kaishore guggulu are the various types of guggul.

Triphala Guggulu

It is a traditionally prepared Ayurvedic herbal formulation composed of the dried fruits of three medicinal plants including, *Terminalia chebula* (*Combretaceae*), *Terminalia bellerica* (*Combretaceae*) and *Embolia officinalis* (*Euphorbiaceae*), which are combined with *Piper longum* (*Piperaceae*) and *Commiphora wightii* (*Burseraceae*). It is one of the widely used preparations in Ayurveda that possess both the rejuvenating and detoxifying

properties of triphala with the profoundly penetrating and cleaning properties of guggul. It clears the body's channels while also scraping natural poisoning substances from the tissues [7]. This formulation is very effective for weight loss since it stimulates agni (digestive fire), supports a healthy metabolism, and eliminates excess kapha. It supports normal digestion and excretion, which reduces the aggregation of toxins in the joints, blood, and GI tract while maintaining general health. [8].

Kaishore Guggulu

In Ayurvedic medicine, Kaishore guggulu or Kishore guggul is herbal treatment based on pure guggulipid. Kaishore guggulu contains Guduchi stem (*Tinospora cordifolia*), Bibhitaki fruit (*Terminalia bellerica*), Amalaki fruit (*Embllica officinalis*), Pippali fruit (*Piper longum*), Haritaki fruit (*Terminalia chebula*), Ginger root (*Zingiber officinale*), Black Pepper fruit (*Piper nigrum*), Nishoth root (*Operculina turpethum*), Danti root (*Baliospermum montanum*) [9]. It is known to have analgesic, anti-inflammatory activity etc, traditionally it is used for skin disorder [10], also used for gout [10, 11], and good in aggravated fibromyalgia patients i.e. muscle pain.

Its key components are triphala, guduchi and trikatu. These key components together with guggul, create a strong detoxifying and rejuvenating combination targeted particularly at eliminating deep-seated pitta from the tissues. It supports the general health and appropriate function of the joints, muscles, and connective tissue by nourishing and strengthening the system [12].

Both guggul form mainly contain triphala and guggul. Thus, the primary phytoconstituents are Gallic acid, Guggulsterone E and Z, contributing as the major components of both guggul for the purpose of standardizing this formulation in any of its form including tablets. Gallic acid is a strong antioxidant that possesses various uses such as antimutagenic, anti-inflammatory, and anticarcinogenic activities [13]. Guggulsterone E and Z, the main constituents of the plant [14].

Thus, the present study will help in developing a quality profile about the different formulations of these crude drugs being currently used in the market.

2. METHODOLOGY

2.1 Material

Standard gallic acid was procured from Yucca enterprises. The chemical agents and reagents which were utilized during the experimental work were purchased from Rankem and S. D. Fine Chemicals, India are of analytical grade. Silica gel 60F HPTLC pre-coated plates were purchased from Merck.

2.2 GENERAL METHOD OF PREPARATION

2.2.1 Procedure for the formulation of Triphala Kwatha and Kaishore Guggul Kwatha

The fruits were blend in the powder form. The powder was then extracted by utilizing the extraction vessel. The whole process was carried out at fixed temperature condition. Reduction was done until the quantity was reduced to 1/4th of initial quantity given in table 1 and 3. The Kwath was filtered using filter cloth.

2.2.2 Preparation of Pills

Weighed the given amount of herbs in coarse powder form. The quantity of water was added in iron vessels and boiled until it reduced to its half quantity. To the filtered decoction add remaining herb. It is further heated with continuous stirring and pounding till it reaches gudapaka (semi solid) consistency. Filtered the preparation. Finely powdered rest of herbs were added in the above filtered preparation. The total quantity is mixed well and it is taken into vessels which is smeared with ghee. Then pills are rolled.

2.2.3 Preparation of tablets

Weighed the given quantity of ingredients in coarse powdered form. Heat the ingredients in vessels to produced dump mass. Press the mass under tablet compression machine to produced desired size tablets.

2.3 FORMULA OF FORMULATION

2.3.1 Formulation and Preparation of Triphala Kalpa

Table 1: Formula for triphala kwatha

Sr. No.	Name of Ingredients	Quantity taken
1.	Haritaki	33 gm
2.	Bibhitaki	33 gm
3.	Amalaki	33 gm
4.	Water	800 ml

2.3.2 Formulation and Preparation of Triphala Guggul Kalpa Gutikas

Table 2: Formula for triphalaguggulkalpa gutikas

Sr. No.	Name of Ingredients	Quantity taken
1.	Haritaki	48 gm
2.	Bibhitaki	48 gm
3.	Amalaki	48 gm
4.	Pippali	48 gm
5.	Guggul	240 gm
6.	Pulverized Sugar	85 gm
7.	Talc	10 mg

2.3.3 Formulation and preparation of Kaishore guggul Kwatha

Table 3: Formula for Kaishore guggul tablets

Sr. No.	Name of Ingredients	Quantity taken
1.	Haritaki	768 gm
2.	Bibhitaki	768 gm
3.	Amalaki	768 gm
4.	Guduchi	768 gm
5.	Kwatharth Jal	18.432 lit
	Avashishta Kwatha	9.216 lit
6.	Guggul	768 gm
7.	Haritaki	32 gm
8.	Bibhitaki	32 gm
9.	Amalaki	32 gm
10.	Sunthi	24 gm
11.	Marica	24 gm
12.	Pippali	24 gm
13.	Guduchi	48 gm
14.	Vindja	24 gm
15.	Trivrutmul	12 gm
16.	Dandimul	12 gm
17.	Grut (qs)	100gm

2.3.4 Formulation And Preparation Of Kaishore Guggul Pills

Table 4: Formula for Kaishore guggul pills

Sr. No.	Name of Ingredients	Quantity taken
1.	Haritaki	768 gm
2.	Bibhitaki	768 gm
3.	Amalaki	768 gm
4.	Guduchi	768 gm
5.	Kwatharth Jal (water)	18.432 lit
	Reduced volume of Kwatha	9.216 lit
6.	Guggul	768 gm
7.	Haritaki	32 gm
8.	Bibhitaki	32 gm
9.	Amalaki	32 gm
10.	Sunthi	24 gm
11.	Marica	24 gm
12.	Pippali	24 gm
13.	Guduchi	48 gm
14.	Vindja	24 gm
15.	Trivrutmul	12 gm
16.	Dandimul	12 gm
17.	Grut (qs)	100 gm

2.4 ANALYSIS OF FORMULATIONS

2.4.1 PH

The estimation of pH of the formulation was carried out by potentiometrically. The process involve a reference electrode, the glass electrode and a digital or analogue type pH meter. The estimation was done by taking 1gm of formulation in 10 ml of distilled water.

2.4.2 Total Ash

The estimation of total ash was carried out by incinerating 2- 3 gm of formulation in tared silica or platinum dish. The process was carried out until the formulation is free from carbon. The required temperature condition is not more than 450°C. The dish was weighed on cooling. Repeated the process until there is no change in the weight was observed. With a reference to the weight of air dried drug the percentage of the total ash was calculated.

2.4.3 Acid Insoluble Ash

Dil. HCl of about 25 ml was added in a crucible containing total ash. The undissolved content was filtered through whatman 41 filter. The filtrate was washed using the hot water. Neutralised the filtrate by water washing. The filtrate was then transfer in the crucible using the filter paper. Drying and ignition of residue on hot plate was continue until there is no change in weight. The residue was weighed after cooling for 30 min in desiccator. With a reference to the weight of air-dried drug, acid insoluble ash was calculated.

2.4.4 Water Soluble Extractives

The sample (5gm) was macerated with water of about 100 ml for 24 hrs, followed by shaking the mixture for 6 hrs. The mixture allowed to stand for 8 hrs and filtered. The filtrate (25ml) was dried in a tared petri dish. The drying was carried out at 105 °C and the dried filtrate was weighed. With a reference to the air dried drug the percent of water soluble extract was calculated.

2.4.5 Alcohol Soluble Extractives

The water-soluble extractive procedure was repeated by replacing water with ethanol as solvent. Once the filtrate was dried at 105°C, it was weighed and with a reference to the air dried drug the percent of alcohol soluble extract was calculated.

2.4.6 Moisture Content (Loss on Drying At 105°C)

Weighed 10 gm of air dried material and placed in a tared dish. The drying of the drug was carried out in hot air oven maintained at 105°C for 5 hrs. Weighed the dried sample of drug. The process is continued until the difference between two subsequent weighing is less than 0.25%.

2.4.7 MICROBIAL CONTAMINATION

Total Bacterial Count

Samples in a powder form were weighed (10 gm) and dissolved in 100 ml of sterile nutrient broth. The broth was incubated at 37°C for 24 hrs separately. On completion of 24 hrs incubation period if culture shows growth of organism, then serial dilutions were performed. 1 ml sample (plant material + nutrient broth) was added into 9 ml sterile saline. Similarly, dilutions were carried up to 10¹⁰ and 1 ml of 10⁶ dilutions were pipetted into each of two sterile nutrient agars. Similarly 10⁷, 10⁸, 10⁹ and 10¹⁰ dilutions were pipetted into duplicate plates. Samples were spread on nutrient agar by use of spreader in sterile condition. Incubation of the plates were further carried out at 37°C for 5 days. Positive as well as negative control was run. The numbers of colonies were counted and the average for 3 plates was expressed in terms of microorganism per g of plant sample (colony forming units - cfu per gm of plant sample).

Yeast and Mould

Samples were prepared of concentration 0.1mg/ml by dissolving 10 gm of powdered sample in 100 ml of sterile nutrient broth. Each flask was incubated for 24 hrs at 37°C. On completion of incubation the growth of organism was observed in culture, the serial dilutions were performed. The samples (plant material + nutrient broth) were diluted in the concentration range from 10⁶ -10¹⁰ in sterile saline. 1 ml of 10⁶ dilution was pipetted into each of two sterile Sabourands chloramphenicol agar. Similarly 10⁷, 10⁸, 10⁹ and 10¹⁰ dilutions were pipetted into duplicate plates. Plates were further incubated at 20-25°C for 5 days. Positive and negative control was run. The numbers of colonies were counted the average for 3 plates were expressed in terms of microorganism per gm of plant sample colony forming units - cfu per gm of plant sample).

2.4.8 Heavy Metal

The following metals were examined by the external source of testing; Lead, Mercury, Arsenic, and Cadmium.

2.5 Marker Based Standardization of the Formulation Using HPTLC

2.5.1 HPTLC Instrumentation and Method Development

The precoated silica gel aluminium plate 60F₂₅₄ (20 cm × 10 cm with 250 μm thickness; E. Merck, Darmstadt, Germany, supplied by Anchrom Technologists, Mumbai) was used as stationary phase. The test solutions were spotted in the form of bands of width 6 mm with a CAMAG microlitre syringe. The plates were pre-washed by methanol and activated at 60°C for 5 min prior to chromatography. The slit dimension was kept at 5 mm × 0.45 mm, bandwidth was set at 7mm, each track and 10 mm/s scanning speed was employed. The composition of the mobile phase was toluene: ethyl acetate: formic acid (3.5: 5.5: 1) v/v/v for gallic acid was employed. The linear ascending development was carried out in a twin trough glass chamber saturated with the mobile phase. The optimized chamber saturation time for the mobile phase was 30 minutes at room temperature (25 ± 2°C). The length of the chromatogram run was 80 mm. Subsequently, the plate was allowed to dry at room temperature. The separated bands on the HPTLC plates were scanned over the wavelength of 200 – 400 nm. The source of radiation utilized was the tungsten lamp (or deuterium illumination). The maximum absorbance was found at 271 nm for gallic acid.

Preparation of Standard Solution

The stock solution of gallic acid was 1 mg/ml and working solution was 100 μg/ml.

Sample Preparation

Samples of triphala guggul kwatha and kaishore guggul kwatha . were prepared by adding each sample (100gm) to 50 ml of methanol in volumetric flask. Further dilutions were made to produce 50 μg/ml concentration. 0.22 μ membrane filter was used to filter all samples.

2.5.2 Method Validation [15]

The validation of the developed HPTLC method was carried out according to ICH guidelines.

2.5.2.1 Linearity

The linearity was analyzed for different concentration ranging from 1- 1000 ng/spot were spotted. Least-square regression analysis was used to treat the data of the peak areas plotted against the corresponding concentrations.

2.5.2.2 Precision Studies

The intra- day and inter- day precision was evaluated for the selected method. The triplicates of three different concentrations of each gallic acid and piperine were spotted and analyzed on same day for intra-day study and two different days for inter-day study with respective chromatographic conditions.

2.5.2.3 Accuracy Studies

Recovery study method was employed to evaluate accuracy of the method. The samples were spiked with 80, 100 and 120 % of median concentrations of standards. Accuracy was determined by using following equation:

$$[(\text{spiked concentration} - \text{mean concentration})/\text{spiked concentration}] \times 100.$$

2.5.2.4 Robustness

The estimation of robustness was carried out by making deliberate changes in the combination of mobile phase, chamber saturation time to determine their effect on the retention factor and quantitative analysis.

The mobile phase composition was changed by a 5% change in the methanol content. The saturation duration in the chamber was increased from 15 to 30 minutes.

2.5.2.5 LOD and LOQ

The estimation of LOD and LOQ were done by standard deviation method. Detection limit = $3.3\sigma / S$ and quantitation limit = $10\sigma / S$ where σ is the residual standard deviation of a regression line and S is the slope of the calibration curve.

3. RESULTS AND DISCUSSION

The organoleptic properties such as colour, odour, taste, percentage yield, loss on drying were evaluated for triphala kwatha and for kaishore guggul kwatha given in table no. 5 and 8. It is critical to ensure the safety, quality, and efficacy of medicinal plants. Impurities, moisture, ash content, and solvent residues must all be examined to determine identity and purity. The ash value shows the level of 'cleanness,' and high values may be the result of improper sample handling techniques [16].

The various parameters of triphala guggul kalpa gutikas/ Tablet/ Pills and kaishore guggul tablets/ pills were evaluated summarized in table 6 and 9. The percentage yield of gallic acid in triphala guggul tablet was found to be 0.5%. The hardness of both the formulations was ranges from 3-4 kg/cm² and 2-3 kg/cm² of Triphala guggul

tablet and kaishore guggul tablet respectively. The % friability of Triphala guggul tablet and kaishore guggul tablet was found to be 0.43% and 0.49% respectively. Both the formulations pass the test for weight variation. Both the tablets were disintegrated at 60 min.

The quantitative estimation of physicochemical constant such as pH, total ash content, acid insoluble ash, water soluble extractive, alcohol soluble extractive, moisture content for triphala kwatha and for kaishore guggul Kwatha were tabulated in table 7 and 10. The literature review revealed that there was significant variation observed in the physicochemical values like pH, total ash content, acid insoluble ash, water soluble extractive, alcohol soluble extractive and moisture content [17-19]. The pH of both the formulation is acidic in nature. Triphala Kwatha have higher percentage of ash than Kaishore guggul kwatha. Triphala kwatha also have greater percentage of moisture content, water and alcohol soluble extractive than kaishore guggul kwatha. The percent of acid insoluble ash is less in Triphala kwatha. The determination of microbial count was carried out according to WHO guidelines. Microbial contamination of both the prepared kwatha were found to be within the limits concluded that both the preparations are free from microbial contamination.

According to WHO arsenic and heavy metals like lead, mercury and cadmium were analyzed. Arsenic and heavy metals can be found in medicinal plant materials, which can be caused by a variety of factors such as pollution and pesticide residues. These components must be eliminated from herbal medications since they are harmful even in tiny amounts. It was concluded that the prepared kwatha were pass the test for arsenic and heavy metals.

3.1 Evaluation of Triphala Kwatha

Table 5: Organoleptic parameters of Triphala Kwatha

Sr. No.	Parameters	Values
1.	Organoleptic Characters	
	Colour	Blackish brown
	Odour	Characteristic odour
	Taste	Kashaya, Tikta, Amla
2.	Loss on drying	2.25 w/w

Table 6: Evaluation of triphala guggul kalpa gutikas/ Tablet/ Pills

Sr. No.	Parameters	Values
1.	Hardness (Kg/Cm ²)	3-4
2.	Disintegration time	60
3.	Pulverized sugar	18%
4.	Friability %	0.43
5.	Weight variation test	Pass

Table 7: Evaluation of triphala kwatha

Sr. No.	Parameters	Actual Values	Obtained Values
1.	pH	-	4.20@23 ⁰ C
2.	Total ash	-	4.35%
3.	Acid insoluble ash	-	0.22%
4.	Water soluble extractives	-	85.26%
5.	Alcohol soluble extractives	-	54.28%
6.	Moisture Content (Loss on Drying at 105 ⁰ C)	-	15.85%
7.	Microbial Contamination		
	Total bacterial count	NOT MORE THAN 1000CFU/GM	COMPLIES
	Yeast and Mould	NOT MORE THAN 100CFU/GM	COMPLIES
	E. coli	Absent	ABSENT
	Salmonella	Absent	ABSENT
8.	Heavy Metal		
	Lead	0.3 ppm	PASSES
	Mercury	0.1 ppm	PASSES
	Arsenic	1 ppm	PASSES
	Cadmium	0.2 ppm	PASSES

3.2 Evaluation of Kaishore Guggul Kwatha

Table 8: Organoleptic parameters of of Kaishore guggul kwatha

Sr. No.	Parameters	Values
1.	Organoleptic Characters	
	Colour	Blackish brown
	Odour	Characteristic odour
	Taste	Kashaya, Amla
2.	Loss on Drying	2.20 w/w

Table 9: Evaluation of kaishore guggul tablets/ pills

Sr. No.	Parameters	Values
1.	Hardness (Kg/Cm ²)	2-3
2.	Disintegration time	60
3.	Friability %	0.49
4.	Weight variation test	Pass

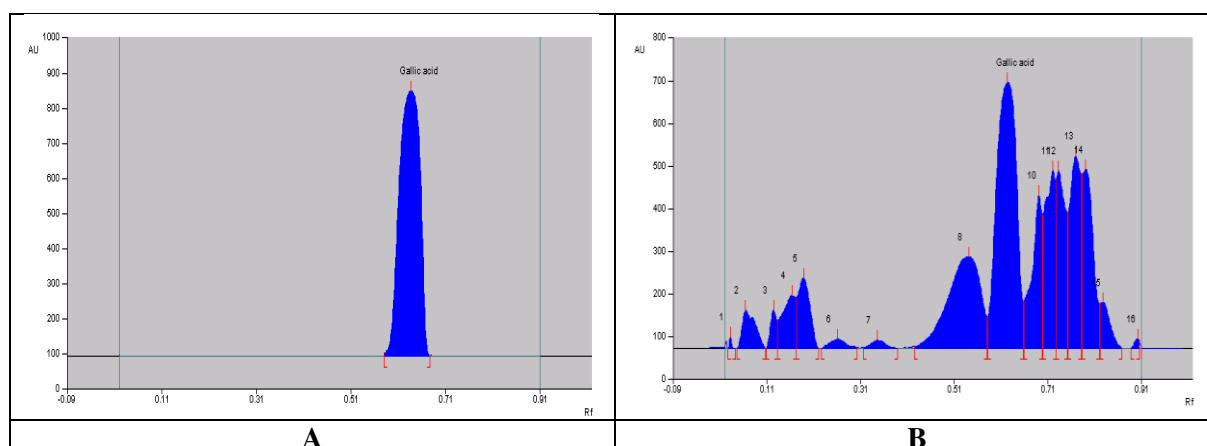
Table 10: Evaluation of kaishore guggul kwatha

Sr. No.	Parameters	Obtained Values
1.	pH	4.18@23 ⁰ C
2.	Total ash	4.15%
3.	Acid insoluble ash	0.25%
4.	Water soluble extractives	84.60%
5.	Alcohol soluble extractives	52.28%
6.	Moisture Content (Loss on Drying at 105 ⁰ C)	14.56%
7.	Microbial Contamination	
	Total bacterial count	COMPLIES
	Yeast and Mould	COMPLIES
	E. coli	ABSENT
	Salmonella	ABSENT
8.	Heavy Metal	
	Lead	PASSES
	Mercury	PASSES
	Arsenic	PASSES
	Cadmium	PASSES

3.3 Marker Based Standardization of Sample

3.3.1 Method Optimization

The optimized HPTLC separation was achieved on TLC plate by employing CAMAG HPTLC system equipped with Linomat 5 autosampler, TLC scanner 3, and WinCATS 1.2.2 software (CAMAG, Muttenz, Switzerland). The separation was carried on silica gel 60 F254 TLC plate using toluene: ethyl acetate: formic acid (3.5: 5.5: 1 v/v/v) as a solvent system. The detection wavelength was found at 254 nm. The optimized chromatographic method give good separation and resolution of the standard gallic acid (R_f value = 0.62) given in figure 2A- G.



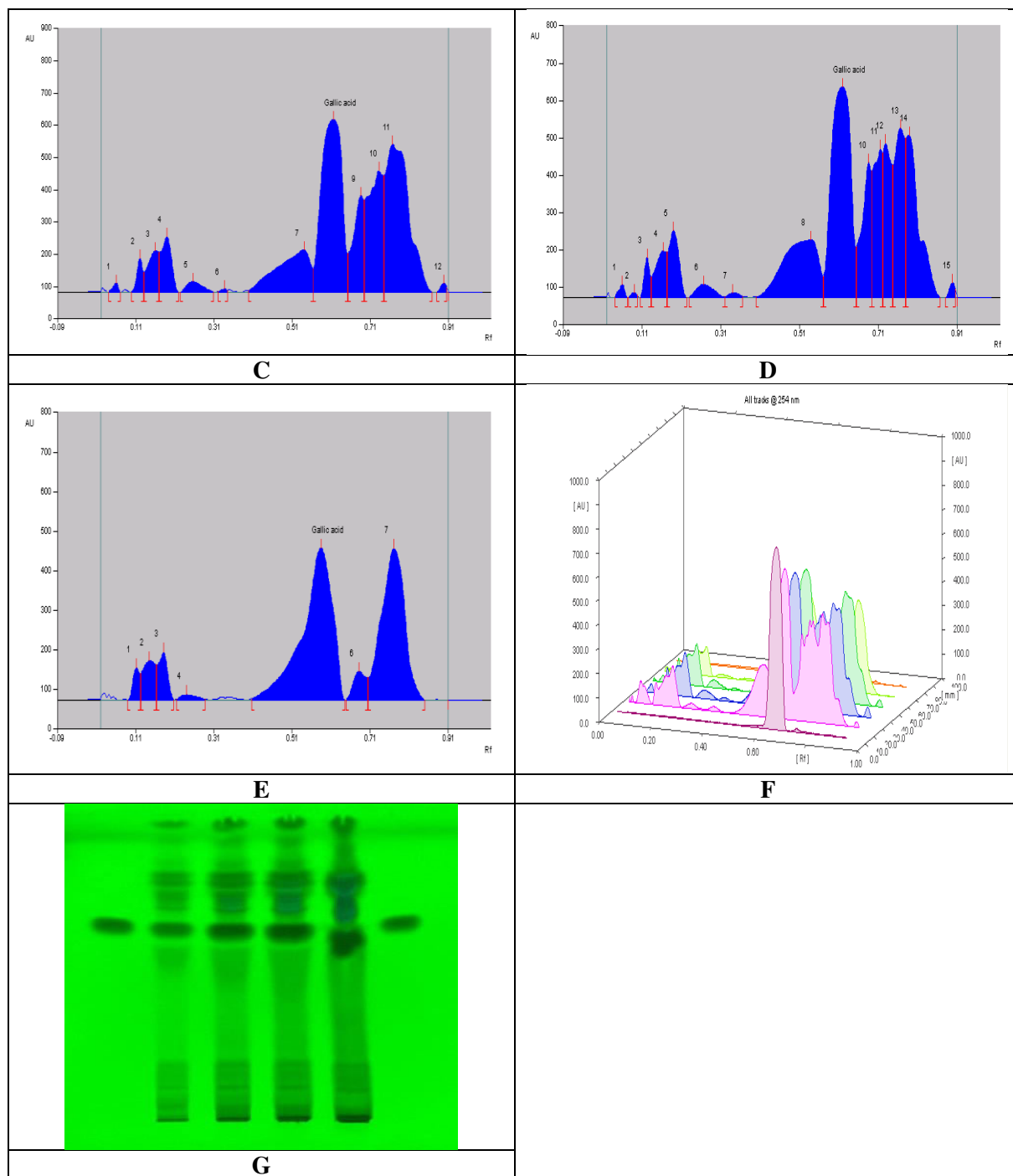


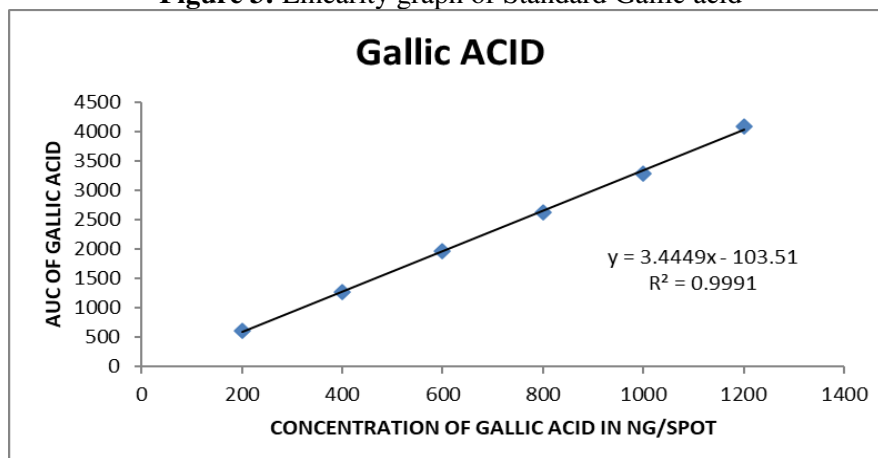
Figure 2: A- HPTLC profile of standard Gallic acid, B- Triphala Guggul, C- Triphala Guggul Pills, D- Kaishore Guggul, E- Kaishore Guggul Pills, F- Gallic acid in all track, G- TLC of standard gallic acid and samples

3.3.2 METHOD VALIDATION

3.3.2.1 Linearity

The linear correlation between the peak area and the applied concentration was discovered in the concentration range 200-1200 ng/ spot for gallic acid under the above-described chromatographic conditions.

Figure 3: Linearity graph of Standard Gallic acid



3.3.2.2 Precision

For gallic acid at three distinct concentration levels, precision data on repeatability (intra-day) and instrumental variation were acquired. RSD was less than 1% in precision studies, showing high precision.

3.3.2.3 Accuracy

The sample comprising of 250 ng of gallic acid was spiked with known amount of standard. The percent ratios between the recovered and expected concentrations were calculated. The recoveries are in the range of 81.80-118.97 %. The results concluded that the proposed HPTLC method was found to be accurate for quantification of gallic acid.

3.3.2.4 Robustness

There was no any variation seen in peak shape and retention time of both the standards with the changes made with mobile phase and chamber saturation time. There was no any change was observed in the separation and resolution of markers.

3.3.2.5 LOD and LOQ

LOD and LOQ for gallic acid were performed and found to be 45.1 ng/spot and 137.8 ng/spot respectively.

3.4 Analysis of In-Housed Formulations of Triphala Kwatha and Kaishore Guggulu Kwatha and Their Respective Solid Dosage Forms

The developed method was able to be providing a well resolved chromatogram with no alterations in peaks of gallic acid.

Table 11: Percentage of gallic acid in formulations

Sr. No.	Formulations	Percent of gallic acid
1.	Triphala kwatha	0.54%±0.25
2.	Triphalaguggulkalpa gutikas	0.61%±0.14
3.	Kaishore guggul tablets	0.59%±0.75
4.	Kaishore guggulu pills	0.63%±0.34

4. CONCLUSION

Now-a-days developed and developing countries used herbal medicines as a potent source of remedies. Ayurvedic medicines are gaining popularity among physicians and patients for better therapeutic value. Guggulsterone is a plant sterol present in the resin of guggul. Since ancient times, the resin has been utilized to cure a variety of ailments, including obesity, bone fractures, arthritis, inflammation, cardiovascular disease, diabetes, hyperlipidemia, atherosclerosis, and osteoarthritis, in Ayurveda. Classical Ayurvedic texts never recommend administration of guggul as a single drug. It should be administered along with other herbs. In the present study the paranormal characteristics of Triphala guggul and kaishore guggul responsible to cure different diseases were studied. Gallic acid is a strong antioxidant that possesses wide range of applications such as antimutagenic, anti-inflammatory, and anticarcinogenic activities [19].

The physicochemical evaluation such as organoleptic properties, percentage yield and LOD provide the safety and quality of the prepared kwath [20]. Manufacturing of tablets should be followed by its quality control tests such as the percentage yield, hardness, disintegration time, friability and weight variation. The disintegration test is a measure of the time required under a given set of conditions for a group of tablets to disintegrate into

particles. Factors affecting the disintegration of tablet dosage are physicochemical properties of drug such as particle size, pH. The friability test helps in determining the physical strength of the tablets which is attributed to the tablet breaking force. Weight variation in tablets is an important factor that is mainly affected by factors such as tooling of the compression machine, head pressure, machine speed and flow properties of the powder, powder or granulate density and particle size. From the results it was observed that all the parameters in quality control test were found to be within the permitted range of the monographs as described in Indian Pharmacopoeia.

The marker i.e. gallic acid was finalized to standardize these formulations and was then confirmed through HPTLC analysis, where R_f values was the basis of confirmation found to be 0.62. The in-housed formulations of triphala kwatha and kaishore guggulu kwatha and their respective solid dosage forms were analyzed for the identification of marker compound (gallic acid). The study involved the comparative study of gallic acid in the prepared formulation. The percent amount of gallic acid was found to be 0.54%, 0.61%, 0.59% and 0.63% in Triphala kwatha, Triphalaguggulkaipa gutikas, Kaishore guggul tablets, Kaishore guggulu pills respectively, concluded that the kaishore guggul pills is the good source of gallic acid. The detailed pharmaceutical and analytical study has confirmed the authenticity and quality of the prepared formulations. It was concluded that the present study can be utilized for routine analysis of raw material and formulation.

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Molecular Docking Studies of Bischalcone Derivatives as Anti-TB Drug Candidate and their Admet Prediction

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ABSTRACT

The purpose of this study was to investigate the biomolecular targets for a library of Indole bischalcone derivatives, analyse docking experiment and investigate their ADMET profile in quest of a lead compound. Among all the synthesized 18 compounds nine compounds doesn't show any violation on Lipinski's rules, seven compounds showed one violation and remaining two compounds showed two violations. According to these investigations, indole bischalcones fit well with 1DG5 protein structurally, therefore it is reasonable to predict that they will have pharmacological effects in animals. The title compounds were Energy minimised before they are docked to the active site of protein (1DG5). All the synthesized compounds showed good moldock score compared to standard trimethoprim. Trimethoprim showed moldock score was -103.147 and compound S1 showed moldock score -161.92 remaining all the compounds showed moldock score in between -143.848 to -111.838. This research may be utilised to validate the model through in-vitro and in vivo tests. .

Keywords: Molecular docking, DHFR, Bischalcones derivatives, ADMET, ANTI-TB.

INTRODUCTION

Tuberculosis (TB) is a major health problem around the world, with 1.7 million cases reported by the World Health Organization (WHO) in 2007 and a global incidence rate of 9.27 million cases.¹. This issue will get worse due to the emergence of multidrug-resistant tuberculosis (MDR-TB), which also poses a threat to infectious diseases. Mycobacterium tuberculosis has been the cause of TB (MTB). These bacteria grow slowly and require a well-equipped laboratory for culture and diagnosis. The process of obtaining a culture and making a diagnosis for TB agents is time consuming and complicated. This is why molecular technologies are so critical for quick diagnostics as well as genotyping.²

There are many cell components that are affected by inhibition of the enzyme dihydrofolate reductase (DHFR), including tetrahydrofolate, purines, the amino acids methionine and glycine, and other cell components. DNA synthesis is halted when thymidylate is depleted.³

Purines, thymidylate, methionine, glycine, pantothenic acid and N-formyl-methionyl tRNA are all products of the DHFR enzyme^{4,5}, which is responsible for the nicotinamide adenine dinucleotide phosphate (NADPH)-dependent reduction of DHF^{6,7} to THF.^{6,7,8,9} It has been shown that DHFR is a monomeric molecule with numerous secondary structural components¹⁰. Adenosine-binding subdomain and loop subdomain are two distinct parts of the protein.¹¹ The NADPH adenosine molecule is linked by the bigger of the two adenosine-binding subunits. There are three loops in this subdomain. The active site is located between the two subdomains and is where folate and NADPH are bound. The movement of the two subdomains controls the active site's size.¹¹⁻¹³ According to DHFR's transcriptional regulation in terms of its TATA-less promoter and several transcription factors, including Sp1 and E2F, which are critical throughout the cell cycle.^{14,15,16}

MATERIALS AND METHODS

To determine the most likely configuration in which a ligand will bind to a macromolecule, the compounds were docked using the Molegro Virtual Docker (MVD) into the 1DG5 protein binding site. During docking simulations, ligands and proteins are treated as malleable entities. In the Generic Evolutionary Method for molecular DOCK, a new hydrogen bonding term and new charge schemes were added to the piecewise linear potential (PLP), a simplified potential whose parameters were adapted to protein–ligand structures and binding data scoring functions.

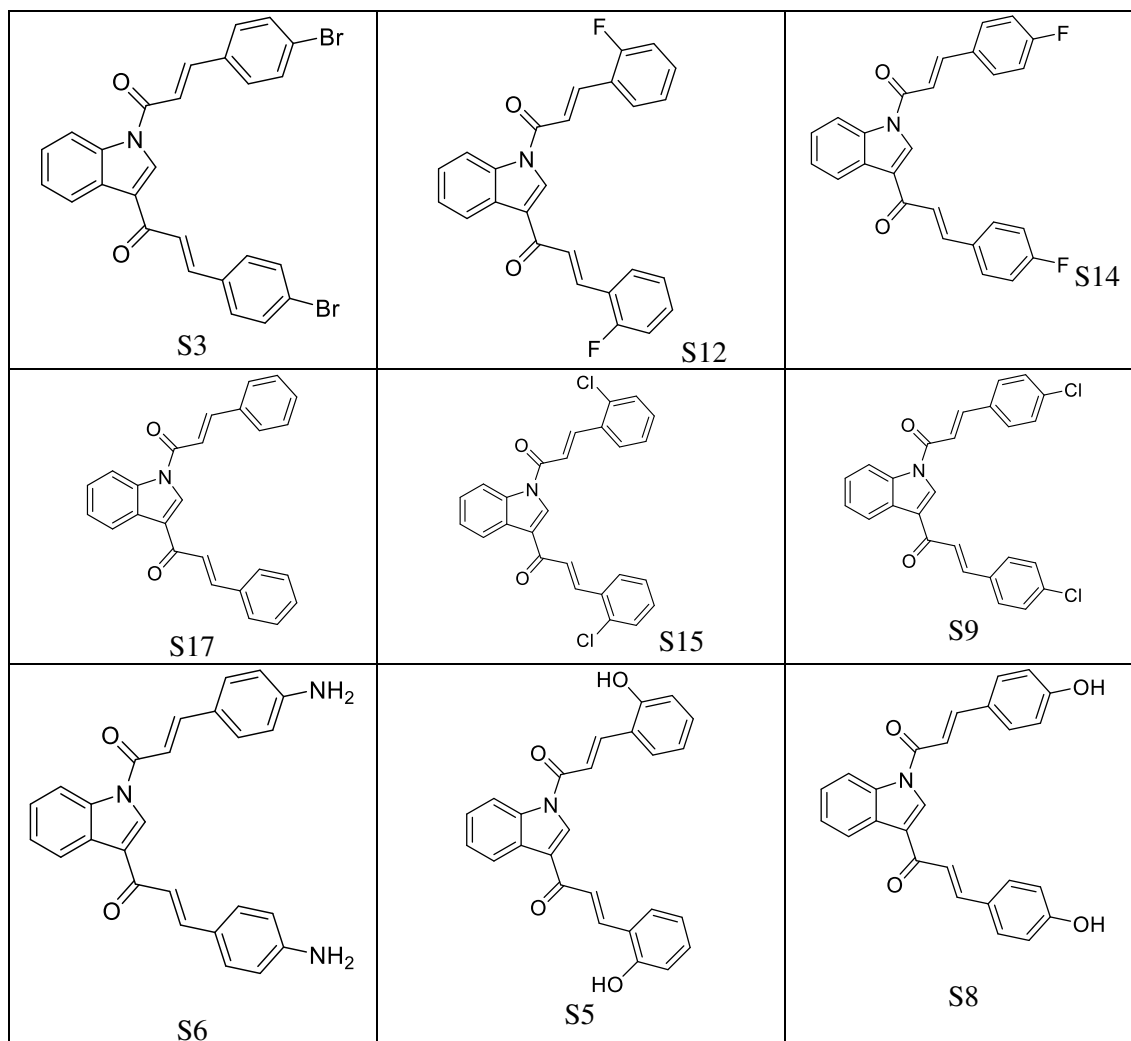
All ligand atom pairs except those linked by two bonds are included in the first term (double summation). In the second term, θ represents the bond's torsional angle, which is a torsional energy term if many torsions could be determined, the average of the torsional energy bond contribution is employed. In the final term, Eclash, heavy atoms (more than two bonds apart) that are less than 2.0 Å apart are penalised by 1000 points¹⁷. A flexible molecule is automatically superimposed onto a rigid template molecule using these functions, which can be summarised as follows, an evolutionary algorithm based on Darwinian evolution theory and a new hybrid

search algorithm termed guided differential evolution are used in MVD's docking search algorithm. The guided differential evolution is a search algorithm that uses the differential evolution optimization approach and an analysis of predicted cavities to quickly and accurately identify possible binding modes in the search process (poses) ^{18,19,20}.

Firstly, 1DG5 dihydrofolate reductase of mycobacterium tuberculosis complexed with trimethoprim is downloaded from RCSB-PDB in pdb format which then in molegrovirtual docker protein is uploaded and water molecules are removed and imported. Then in protein preparation F3 remove warnings by optimising. Then give a right click on protein to create surface followed by detect cavities. Then in the view and reset the view. Then go to the ligand in the left side convert all ligands to cofactors, except active ligand. Active ligand is removed from the workspace, then import we import the ligands (S1-S18) in **table -1**, then go to the docking and click the docking wizard and start the docking. After the completion of the docking results are imported from the system and select the top pose score and dynamic pose is created, and the ligand is removed from the workspace. Then the pose is converted into ligand, then we create the labels for the protein, followed by removing cavities, cofactors and constraints. Interactions are known from the ligand map. Detected and interacted amino acids are captured.

Fig:3 shows the conformers of the ligand that are most closely connected with the bioactive conformation of S1 indicated as the highest energy-scored protein–ligand combination employed during docking. **Fig:2** depicts both standard and compound interactions, the latter of which having the greatest docking score, S1. **Fig: 5** shows the dock scores in comparison to trimethoprim, the gold standard for treating tuberculosis. The docked binding mode of these drugs is used to link the MolDock score, structural characteristics, and biological activity against the DHFR. ^{20,21} Docking data was evaluated taking into account protein–ligand complementarity, which included both steric and electrostatic characteristics. ²²

Table-1: Structures of Indole Bis chalcone derivatives



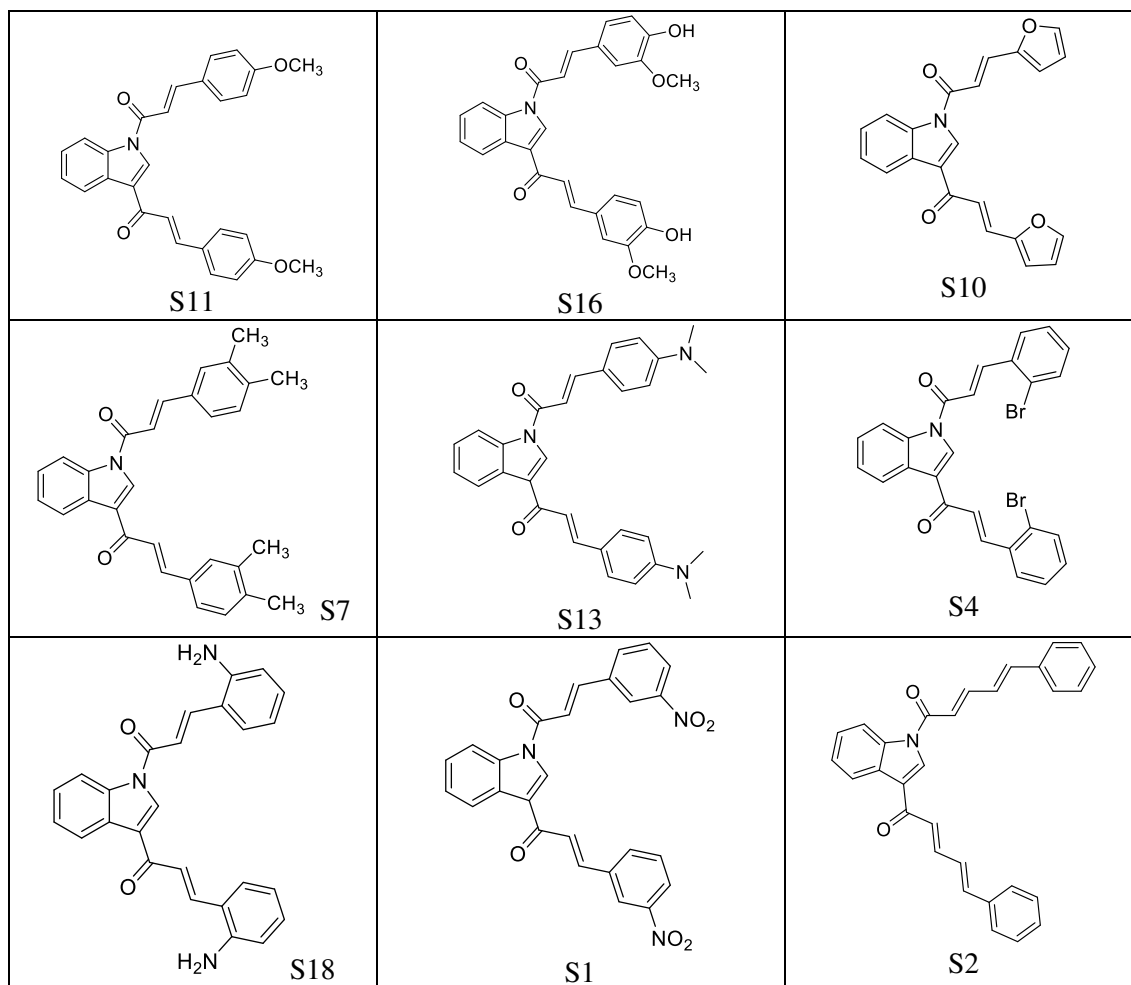
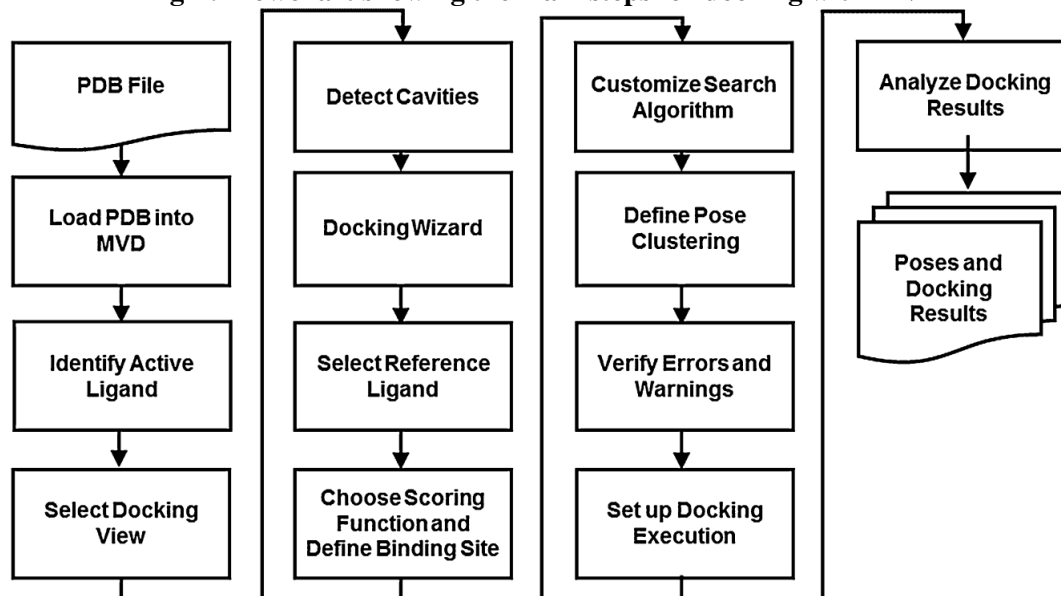


Fig-1: Flowchart showing the main steps for docking with MVD



RESULT AND DISCUSSIONS:

The docking of protein 1DG5 dihydrofolate reductase with Indole bischalcone derivatives was studied molecularly. All of the postures were sorted according to their docking score after being checked to see which of the proteins they represented had binding connections. The compounds that has a high negative docking score is more active than the other compounds. **Table 2** displays the Molegro virtual docker docking scores for indole bischalcone derivatives (S1-S18). Almost all compounds show interactions with aspartate (ASP) except S2, S4, S6, S10, S12 and S15. The standard drug trimethoprim show both steric and electrostatic interactions

(THR-46, ALA-7, ILE-5, TRP-6, ILE-94, ASP-27, TYR-100, TOP-201A) with protein 1DG5 and moldock score -103.147, rerankscore--89.2468, H-bond --6.10567. Among all the indole bischalcone derivatives compound S1 has the highest dock score (-161.92) and its rerank score is (-26.1437), H-bond(-3.5147). The compound S1 also shows steric and electrostatic interactions (ASP-19, GLY-18, LLE-20, SER-49, TRP-22, ASP-27, GLN-28, LEU-24) with protein 1DG5.

Table:2 Molecular docking results of indole derivatives with protein1dg5(dihydrofolate reductase)

ligand	MOL DOCK SCORE	RERANK SCORE	H- BOND	INTERACTIONS (STERIC & ELECTROSTATIC)
Trimethoprim	-103.147	-89.2468	-6.10567	THR-46, Ala-7, ILE-5, TRP-6, ILE-94, ASP-27, TYR-100, TOP-201A.
S1	-161.92	-26.1437	-3.51477	ASP-19-GLY-18, LLE-20, SER-49, TRP-22, ASP-27, GLN-28, LEU-24.
S2	-143.848	-103.21	0	ARG-45, GLY-17, LEU-127, GLY-124.
S3	-138.337	-100.225	-0.351719	ALA-126, ASP-48, GLY-124,
S4	-137.962	-95.2379	-0.158571	ALA-126.
S5	-136.841	-99.2609	-0.00183904	ASP-125, ALA-126, ARG-45
S6	-135.012	-98.5139	-0.817316	ALA-126.
S7	-133.927	-102.863	0	ASP-19, SER-49, GLY-18, ASP-48, GLY-124, ASP-125, ARG-16.
S8	-130.421	-78.4026	-5.45879	ASP-19, GLY-18, SER-49, TRP-22, ASP-27, PHE-31, LEU-24.
S9	-128.606	-71.6486	-0.0422867	ASP-27, GLN-28, TRP-22, ASP-19, SER-49, LLE-20.
S10	-126.587	-95.7055	-0.124467	GLY-124, ALA-126, ARG-45.
S11	-125.439	-88.8067	0.525682	ASP-125, ARG-45, GLY-124, GLY-18,
S12	-125.378	-78.9437	-0.324317	ALA-126, ARG-45, GLY-124.
S13	-122.782	-80.0553	-0.040856	ARG-45, GLY-18, ASP-19, LEU-24, SER-49, LLE-20.
S14	-121.857	-71.2656	0	GLN-28, ASP-27, LLE-20, TRP-22, SER-49, ASP-19.
S15	-120.833	-84.1598	-1.11671	LEU-102, LEU-127, ALA-126, ARG-45, GLN-98,
S16	-119.497	-20.3561	-4.40779	ASP-48, ARG-48, GLY-97, GLY-18, GLY-124, LEU-127.
S17	-115.529	-42.5051	-0.42744	GLN-28, ASP-27, LLE-20, TRP-22, LEU-24, ASP-19.
S18	-111.838	-84.854	-7.61996	ASP-19, GLY-17, TRP-22, SER-49, LLE-20.

Evaluation of ADME Properties:

An assessment of ADME and similarity to a drug Candidates for medications should have positive ADME properties and, preferably, be free of hazardous side effects." As a result, the produced compounds were examined for their ADME profile, which included drug-likeness, partition coefficient, solubility, and numerous other parameters, using the Swiss ADME module provided in the SIB webserver (<https://www.sib.swiss>). **Table 3** showed that most of the compounds were passed through drug likeliness criteria, namely Total Polar Surface Area (TPSA), Lipophilicity, water solubility and Lipinski rules.^{23,24}

Table-3: swiss ADME predicted results showing various physiochemical descriptors of the compounds.

COM POUND	H-bond acceptors	H-bond donors	TPSA	iLOGP	XLOGP3	WL OGP	MLOGP	GI absorption	BBB permeant	Pgp substrate	Lipinski violations
S18	2	2	91.11	3.1	4.37	4.85	3.14	High	No	No	0
S12	4	0	39.07	3.88	5.94	6.79	5.03	Low	No	No	1
S4	2	0	39.07	4.28	7.12	7.2	5.42	Low	No	No	2
S15	2	0	39.07	4.06	6.99	6.98	5.22	Low	No	No	1
S5	4	2	79.53	2.99	5.02	5.08	3.14	High	No	No	0

S1	6	0	130.71	2.67	5.39	5.49	3.22	Low	No	No	0
S3	2	0	39.07	4.4	7.12	7.2	5.42	Low	No	No	2
S6	2	2	91.11	2.95	4.37	4.85	3.14	High	No	No	0
S8	4	2	79.53	2.92	5.02	5.08	3.14	High	No	No	0
S9	2	0	39.07	4.2	6.99	6.98	5.22	Low	No	No	1
S14	4	0	39.07	3.87	5.94	6.79	5.03	Low	No	No	1
S11	4	0	57.53	3.85	5.68	5.69	3.54	High	No	No	0
S13	2	0	45.55	4.25	5.98	5.81	3.93	High	Yes	No	0
S17	2	0	39.07	3.68	5.73	5.67	4.29	High	Yes	No	1
S7	2	0	39.07	4.6	7.19	6.91	5.08	Low	No	Yes	1
S2	2	0	39.07	3.66	7.02	6.79	4.94	Low	No	No	1
S16	6	2	97.99	3.48	4.97	5.1	2.47	High	No	No	0
S10	4	0	65.35	3.34	3.94	4.86	1.84	High	Yes	No	0

Fig-2 Interactions of Standard drug trimethoprim and compound S1 with protein 1DG5

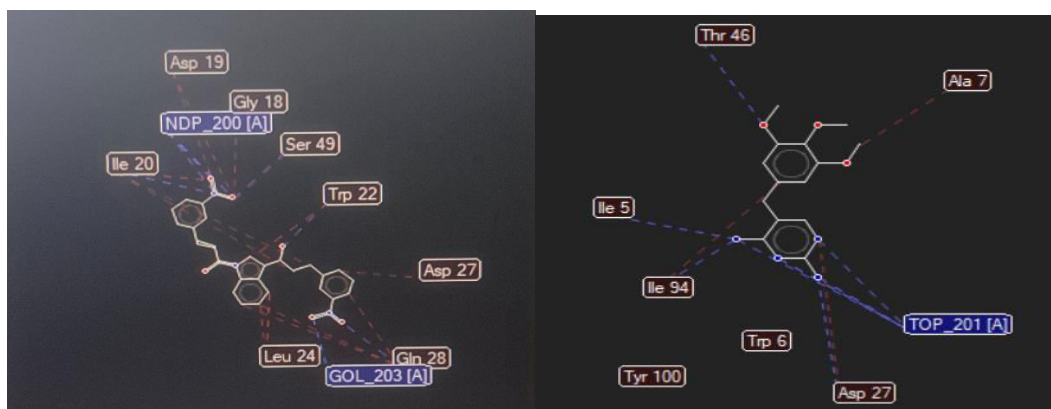


Fig-3 Docked pose of compound S1 with protein.

Fig-4: structure of 1DG5 protein

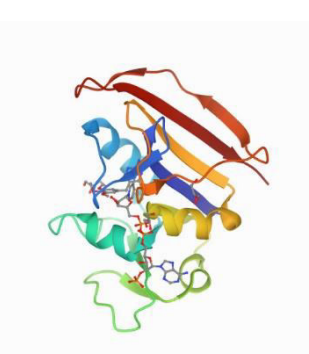
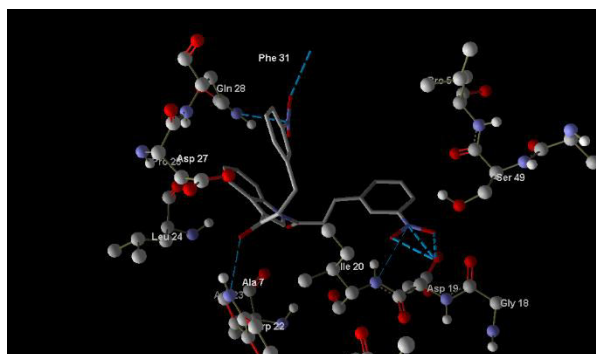
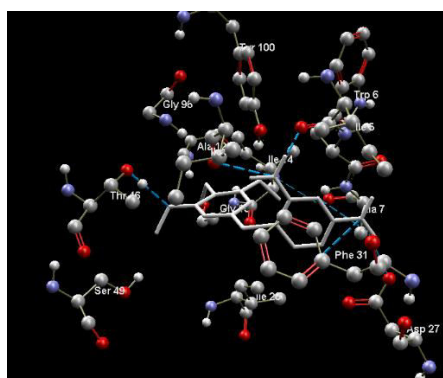


Fig-5: Docked pose of standard drug trimethoprim with protein



CONCLUSION:

Eighteen Indole bischalcone derivatives were selected for investigation of bioactivity prediction. The selected Indole bischalcone library is considered to contain potential candidates for further research development as their bioactivity prediction indicates that they can act on various drug targets, anti-tubercular activity might be

attributed to their ability to inhibit dihydrofolate reductase. All these studies suggest the ability to selected library to target 1DG5 protein and compound 1 has great potential to inhibit DHFR. Compound S1 shows highest dockscore (-161.92) when compared to other indole bischalcone derivatives. The standard anti-tb drug trimethoprim shows interactions THR-46, Ala-7, ILE-5, TRP-6, ILE-94, ASP-27, TYR-100, TOP-201A with protein 1DG5. The in silico predictions reveal that the title compounds could be potential anti tubercular medicines with specificity in blocking the Mycobacterium tuberculosis dihydrofolate reductase enzyme.

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Child Sexual Abuse and Problems of Adjustment: A Case Study of Kashmir

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ABSTRACT

Child Sexual Abuse (CSA) is a traumatic experience influencing children's behaviour. Although it has been documented throughout history, what has varied considerably has been the willingness of many cultures, especially in South Asia, to recognise it as a problem. It has been considered a complex life experience, not a diagnosis or disorder. The experience has been found to negatively impact children's overall development, adjustment, and health. Multiple studies have reported various adjustment issues among the victims of CSA like shame, self-blame, maladaptive coping strategies, distorted perceptions of their physical body (i.e., attractiveness, strength, vulnerability), and/or their sexuality (i.e., body image, sexual vulnerability), poor adjustments at home, general health issues, unsatisfactory social adjustments, week and unbalanced emotional development, and family problems. According to the World Health Organization (WHO), approximately 20% of women and 5-10% of men report being sexually abused during childhood. It corroborates the fact that child sexual abuse is a real problem. This paper demonstrates how CSA affects the overall adjustment process of an individual. Adjustments included are adjustments at home, health, social adjustments, and emotional adjustments. Taking Kashmir as a case study, the research was drawn from locally identified CSA victims through various psychologists and psychiatrists following the snowball sampling (purposive sampling) technique. Problems of adjustments were determined using Bells Adjustment Inventory (BAI-o) developed by R.K. Ojha in 1968. The sample included 40 participants aged 20-35 (22.5 % were males and 77.5% were females). I argue that CSA being the most neglected form of child abuse in Kashmir, it has influenced different types of adjustment of a victim negatively. I conclude with some reflections on the nature of adjustments among the CSA victims and how the adjustments vary among male and female victims.

Keywords: Child abuse, child maltreatment, child sexual abuse, CSA, sexual abuse, adjustment issues, sexuality

INTRODUCTION:

Child sexual abuse (CSA) is considered one of the worst experiences of children that impacts them drastically. It has been considered a complex life experience, not a diagnosis or disorder (Putnam, 2003). The definition of sexual exploitation has evolved throughout history (Crosson-Tower, 1999). Defining CSA has become complicated with varying advancements made by perpetrators toward children. The Diagnostic and Statistical Manual of Mental Disorder Fourth edition (DSM-IV) defines CSA as a form of child abuse in which an adult or older adolescent uses a child for sexual stimulation. Forms of child sexual abuse include asking or forcing a child to engage in sexual activities (regardless of the outcome), indecent exposure (of the genitals, female nipples, etc.) to gratify perversion, intimidating or grooming the child, physical, sexual contact with a child, or using a child to produce child pornography. With the new ways of abusing children, primarily through the internet used by the perpetrators, the definition of CSA is also changing. For example, numerous other words are used synonymously, like sexual exploitation, assault, molestation, victimisation, and child rape (Crosson-Tower, 1999).

A review of 217 studies by UNICEF found that one in eight of the world's children (12.7%) had been sexually abused before reaching 18. In some contexts and organisational settings, victimisation among boys is higher than among girls. It is difficult to estimate how widespread CSA is, as its occurrence in the general population tends to be underreported. Statistics on child sexual abuse vary considerably because of the differences in victim age categories and state reporting requirements. Children and family members are also reluctant to report the abuse due to dynamics of secrecy and pressure from the offender (Cicchetti & Carlson, 1989).

However, the sexual abuse of children is not a new phenomenon. Documentation throughout centuries attests to its common occurrence (Bifulco & Moran, 2002). Reasons for its late recognition as a prevalent form of abuse are complex. One reason is that it is still probably the most secret and covert of all the abuses (Bifulco & Moran, 2002). Maintaining secrecy regarding CSA has its own negative influence on victims. The overall negative consequences of CSA on the victims are drastic and lifelong. Multiple studies have reported many short-term and long-term negative consequences of CSA like Post Stress Traumatic Disorder (PTSD), drug abuse, and depression. Although most common of them are related to mental health, not every child is affected by sexual abuse similarly. The degree of trauma the child experiences depends on several variables: type of abuse, the identity of the perpetrator, duration of the abuse, the extent of the abuse, age at which the child was

abused, first reactions of significant others at disclosure, the point at which the abuse was disclosed, and the personality structure of the victim (Crosson-Tower, 1999).

Various studies have revealed that sexually abused children experience various psychological and interpersonal problems. The immediate and long-term effects of CSA are: post-traumatic stress, depression, cognitive distortions, emotional pain, and avoidance, an impaired sense of self and interpersonal difficulties (Briere & Elliott, 1994). The most familiar manifestations were anxiety, depression, dissociation, somatisation and obsessive traits (Margoob et al., 2006). The other common effects are PTSD with variable associated symptoms of depression, suicide tendencies, psychotic features, and obsessive-compulsive behaviours. Because of social stigma, the victims do not reveal the abuse, and when they do, they are not believed (Firdosi & Margoob, 2006). The long-term impact of CSA on health and social adjustments is also reported to be similar to men and women include drug abuse, suicidal attempts, family problems, and depression (Dube et al., 2005).

Apart from the mental health issues, various studies (Tapia, 2014) have reported multiple adjustment problems among CSA victims. The adjustment problems are found to be life-long, affecting multiple aspects of the life of an individual. A study by Tapia (2014) revealed that the adult victims might develop distorted perceptions of their body (i.e., attractiveness, strength, vulnerability) and/or their sexuality (i.e., body image, sexual vulnerability). Hence, creating conflict between victims and his/her emotional development (Roberts et al., 2004).

OBJECTIVES OF THE STUDY:

The objective of this research is

To study various adjustment processes among the victims of Child Sexual Abuse (CSA) in Kashmir.

Various adjustments included are adjustments at home, overall health, social and emotional adjustments. The study focuses on both male and female CSA victims in Kashmir. However, the male victims were unwilling to participate in the study, so I have included fewer male victims (22.5 %) than the female victims (77.5%).

RESEARCH QUESTIONS:

Though the relationship between CSA and various mental health issues is firmly established, the important issue of adjustment problems has not been addressed fully. Multiple studies have reported many adjustment issues like a distorted image of self, poor social development, etc. However, the overall adjustment of the victims in society and with self remains unclear.

This study focuses on how specific are the adjustment problems among the victims of CSA.

Does each victim get influenced in a similar way?

Are the multiple aspects of adjustment, i.e., adjustment at home, health, social adjustment, and emotional adjustment, as variables measured by the tool employed, equally influenced?

METHOD:

Sampling and Study Location:

The study was conducted through the snowball sampling technique (purposive sampling). Various psychiatrists and psychologists were approached initially, where outpatients were provided. The outpatients included general patients who had regularly scheduled appointments. The sample included were also locally identified people through various means like known victims. The study was conducted in Srinagar, one of the districts of Kashmir, India. The study has been carried out in 2015.

Measures of Adjustment Problems:

I employed Bell's Adjustment Inventory (BAI-o) developed by R.K.Ojha in 1968, to collect data related to adjustment in various areas. The inventory consists of four parts, where 35 statements are included in every part. The four areas in which the adjustment is measured are: Home, Health, Social, Emotional

The description of the areas is given below:

Home: This part includes statements related to home adjustments. For example, having a firm idea of absconding from home, how the relations are maintained with family members, parenting methods used, etc.

Health: This part includes statements that enquire about an individual's health conditions. It includes statements like having continuous headache, indigestion problems, being seriously ill for the last 10 years, etc.

Social: This part includes statements that investigate how well an individual is adjusted socially by asking the questions regarding social adjustments only. The statements included in this part are: Do you enjoy social gatherings or meeting with others? Do you hesitate to talk with strangers or fellow travellers? Do you make friends readily, etc.

Emotional: In this part, statements included probes into the emotional adjustments of an individual. The statements like; do you daydream, do you envy others' happiness, do you lose courage quickly, do you usually get irritated without any specific reason, etc are given to find out how well an individual has adjusted emotionally.

Scoring: The inventory consists of 140 statements divided into four parts (35 in each) that need to be answered in "yes" or "no" only. For scoring, only 'yes' responses are included. For each 'yes' response, one mark is given. When an individual answers in 'Yes', it indicates his difficulties and when s/he answers in 'No', it indicates that the individual has no such difficulty. The total number of 'yes' scores thus makes the total score of the individual in part. At the end, the score is compared with the general norms table provided in the manual that indicates how well an individual is adjusted in each area.

RESULTS:

Multiple aspects of adjustments like adjustment at home, overall health, social adjustment, and emotional adjustments have been measured among the victims of Child Sexual Abuse (CSA). The results obtained have been recorded and scored to provide a complete picture of the impact of CSA on the victim's adjustments. The participants' ages ranged from 20-35 years, including males and females. Multiple aspects of adjustments issues have been provided in tables:

Table 1: Adjustment at home (relationship with their parents or siblings)

Number of respondents	Excellent	Good	Average	Unsatisfactory	Very unsatisfactory	Total
40	5%	2.5%	40%	20%	32.5%	100%

The above table shows that a significantly lower number of the participants (2.5% and 5%) had a good or excellent relationship with their family members. There were few family quarrels at home, showing that their adjustment at home was good. Most respondents, i.e., 40 per cent, had average adjustments as their parents were not strict. While 20% of the respondents had unsatisfactory home adjustments, they had firm ideas of running away from home. Nearly one-third of the respondents had very unsatisfactory home adjustments because their parents suspected them of their character, or they were asked to leave the home.

Table 2: Health adjustments

Number of respondents	Excellent	Good	Average	Unsatisfactory	Very unsatisfactory	Total
40	0%	5%	32.5%	10%	52.5%	100%

The above table reveals that none of the respondents adjusted excellently to positive health conditions. Five per cent of the participants had good health conditions as they did not feel tired most of the time but had no serious health problems. However, 10 per cent of respondents experienced unsatisfactory health conditions as they usually felt dizziness and headaches. Nearly one-third of the respondents showed average health achievements as they were experiencing sharp headaches and gas problems and had no less than average body weight. While as more than double of the participants had very unsatisfactory health conditions as they were not able to sleep properly, always felt tired in the morning, took food even without feeling hungry, and often had to take medicines.

Table 3: Social adjustments

Number of respondents	Excellent	Good	Average	Unsatisfactory	Very unsatisfactory	Total
40	7.5%	10%	42.5%	22.5%	17.5%	100%

The table illustrates that the respondents who made either excellent or good social adjustments were 7.5% and 10%, respectively, as they enjoyed social gatherings and did not hesitate to initiate conversation even with an unknown person. Nearly half of the respondents had average social adjustments as they could deliver a speech in the classroom but did not feel like talking with a fellow traveller. And more than one-third of the participants made unsatisfactory and very unsatisfactory social adjustments as they avoided meeting with known persons and avoided social gatherings.

Table 4: Emotional adjustments

Number of respondents	Excellent	Good	Average	Unsatisfactory	Very unsatisfactory	Total
40	2.5%	0%	25%	15%	57.5%	100%

It can be seen from the above table that only a fraction of the participants, 2.5 per cent, dealt excellently with their emotional adjustments. They did not get frightened by the idea of earthquake or fire and did not envy the happiness of others which shows that their emotional adjustment was excellent. None of the respondents was good at emotional adjustments. In comparison, 25% and 15% of the respondents had average and unsatisfactory emotional adjustments, respectively, as they usually did not feel sad during their acts but did get sad without any specific reasons. However, more than double the respondents had very unsatisfactory emotional adjustments as tears came quickly to their eyes. They were also found to be perplexed by the idea of inferiority.

Table 5: Adjustments made by Males and Females

No. of Respondents	Gender	Areas	Excellent	Good	Average	Unsatisfactory /Very Unsatisfactory	Total
9	Males	Home	0%	0%	33.3%	66.7%	100%
		Health	0%	0%	22.2%	77.8%	100%
		Social	11%	0%	33.3%	55.7%	100%
		Emotional	0%	0%	22.2%	77.8%	100%
31	Females	Home	6.4%	3.2%	38.8%	51.6%	100%
		Health	0%	6.4%	35.6%	58%	100%
		Social	9.6%	9.6%	42%	38.8%	100%
		Emotional	3.2%	0%	25.8%	71%	100%

The above table reveals that the majority of males, i.e., (66.7%), had made unsatisfactory/very unsatisfactory home adjustments, while 51.6% of females made unsatisfactory/ very unsatisfactory home adjustments. None of the male respondents made an excellent home adjustment, while 6.4% of females made an excellent home adjustment. 77.8% of males made unsatisfactory/very unsatisfactory health adjustments compared to females, in which only 58% of respondents made unsatisfactory health adjustments. Excellent health adjustment was made by neither males nor females. Furthermore, more than half of male respondents had made unsatisfactory/ very unsatisfactory social adjustments, while 38.8% of females made an unsatisfactory social adjustment. Nearly similar percentages of male and female respondents made excellent social adjustments. 77.8% male respondents made unsatisfactory/very unsatisfactory emotional adjustment as compared to 71% of the female respondents. More than three per cent of women made an excellent emotional adjustment while men made none.

DISCUSSION

The study highlights three main aspects related to CSA (a) to examine multiple aspects of adjustment problems existing among the victims of CSA; (b) if all the victims get influenced in a similar manner; and (c) if all the aspects of adjustment get equally influenced.

CSA and multiple adjustment problems:

In this study, various aspects of adjustment were found to be negatively influencing most of the individuals. The most influenced aspects of adjustment found were overall health and emotional adjustment. Social adjustments were found to be the least influenced among the four aspects of adjustment, while adjustment at home was also found to be influenced to a greater degree. As far as influence on all the victims is concerned, males were found to be influenced more than females in every aspect, especially the health. The overall health of male victims was found to be drastically influenced, especially mental health. Males were also found unable to adjust socially than their female counterparts. Apart from mental health, the physical health of the victims was also found to be negatively influenced, where the victims mostly experience severe headaches. The negative impact on the victims was found to be dependent on the severity of the abuse. The higher the severity of the abuse, the more were the adjustment problems. Emotions in both males and females were affected almost equally, while both males and females could not make emotional adjustments.

These findings suggest that among the victims of Child Sexual Abuse (CSA) in Kashmir, CSA independently affects the adjustment process, including mental health. While diminishing the negative influences might eventually occur due to multiple factors, it might not be the case for every individual. Also, the severity of the abuse greatly influences the victim, increasing or decreasing the negative consequences. Consistent with the

findings of other studies, the data does not indicate specific adjustment issues by abuse type. Instead, it was found that a high severity of abuse is a specific prevalence factor for a higher level of negative consequences on the overall adjustment process of the victims.

LIMITATIONS

The present study has multiple limitations. First, the sample drawn did not include the whole general population, instead, the sample was already identified. Therefore, the application of the results of this study to the general population is limited. Second, the study does not provide the prevalence rate of CSA among the general population, which could have made the study more insightful. Third, the sample ratio of male-female was not equal. While the males were very hesitant to participate in the study, some females were also difficult to motivate. The study could have provided better outcomes if males and females had equally participated. Finally, due to variations in age group, the findings could also not be generalised to the whole population. While some of the victims experienced abuse more than 25 years ago, some had experienced the abuse just a few years before. As a result, findings cannot be safely generalised to the older or younger Kashmiri population.

RECOMMENDATIONS

The above findings confirm the existence of Child Sexual Abuse (CSA) in Kashmir. Hence, the importance of conducting the study on CSA on the general population in Kashmir could be done to get an accurate picture of the same. Also, to find the actual prevalence rate of CSA in Kashmir, a study that includes a random sample is needed. Though the CSA is prevalent in rural and urban areas, its existence must be highlighted and recorded. Apart from that, Kashmir being a conservative society gives scope to conduct a longitudinal study to understand the overall outcomes of CSA and its impact on victims.

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Machine Learning and Data Mining Methods in Diabetes Research

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ABSTRACT

The tremendous breakthroughs in biotechnology and health sciences have resulted in a substantial amount of data being created from massive Electronic Health Records, such as high throughput genetic data and clinical information (EHRs). To this aim, the use of machine learning and data mining technologies in biosciences is now, more than ever, critical and crucial in attempts to intelligently turn all accessible data into useful knowledge. Diabetes mellitus (DM) is a collection of metabolic illnesses that have a substantial impact on human health across the globe. Extensive study into all areas of diabetes (diagnosis, etiopathophysiology, treatment, and so on) has resulted in massive volumes of data being generated. The purpose of this study is to conduct a systematic review of machine learning, data mining techniques, and tools in the field of diabetes research with respect to a) Prediction and Diagnosis, b) Diabetic Complications, c) Genetic Background and Environment, and Health Care and Management, with the first category appearing to be the most popular. A variety of machine learning algorithms were used. In general, supervised learning techniques were employed in 85 percent of the cases, whereas unsupervised learning approaches, especially association rules, were used in 15% of the cases. The most popular and commonly used algorithm is support vector machines (SVM). Clinical datasets were mostly employed in terms of data kind. The title applications in the chosen papers demonstrate the value of extracting relevant information to generate new hypotheses aimed at a better understanding and inquiry in DM.

Keywords: Machine learning, Diabetes, Data Mining

1. INTRODUCTION

Significant breakthroughs in biotechnology, particularly high-throughput sequencing, have ushered the field of applied biology into the realm of big data [1,2]. The capacity of comparable techniques to identify patterns and develop models from data is the source of the strength and success of these approaches. This is especially true in the age of big data, when datasets might be terabytes or petabytes in size. As a result of the amount of data, data-driven biology research has become a lot stronger. One of the most significant research applications in such a hybrid area is prognosis and diagnosis for human-threatening and/or life-quality-improving disorders. Diabetic mellitus is one such ailment (DM).

A significant way to using vast amounts of accessible diabetes-related data for extracting information is to use machine learning and data mining approaches in DM research. Because of the disease's severe socioeconomic effect, it's one of the top priority in medical science study, which unavoidably creates a lot of data. Therefore, when it comes to diagnosis, treatment, and other clinical administration elements, machine learning and data mining techniques in DM are unquestionably of considerable significance. As a result, the existing literature on machine learning and data mining methodologies in diabetes research was reviewed as part of this study.

2. MACHINE LEARNING AND KNOWLEDGE DISCOVERY

Machine learning is a branch of science that studies how computers learn from their experiences. For many scientists, the terms "machine learning" and "artificial intelligence" are interchangeable, since the ability to learn is the most important feature of an entity that is considered intelligent in the widest sense. The goal of machine learning is to create computer systems that can adapt to their surroundings and learn from them [3]. Mitchel [4] provides a more formal and precise description of machine learning: If its performance at tasks in T, as measured by P, increases with experience E, a computer programme is said to learn from experience E with regard to some class of tasks T and performance measure P. [5]

Supervised Learning

In supervised learning, the system must inductively "learn" a function called target function, which is an expression of a data model. The objective function is used to predict the value of a dependent variable, also known as an output variable, from a collection of variables, also known as independent variables, input variables, characteristics, or features. Instances refer to the function's collection of potential input values, also known as its domain. A collection of attributes describes each scenario (attributes or features).

Unsupervised Learning

The system seeks to uncover the underlying structure of data or relationships between variables in unsupervised

learning. In this situation, the training data is made up of cases without labels.

Learning to Apply Association Rules The Rule of Association Mining was developed considerably later than machine learning and is influenced more by database research. Rakesh Agrawal [7] suggested it as a market basket analysis in the early 1990s, with the goal of discovering connections across database elements. Association rules for shopping carts are of the type $X_1, \dots, X_n \rightarrow Y$, which indicates that if you locate all of X_1, \dots, X_n in a cart, you can find Y . Apriori, proposed by Rakesh Agrawal in 1994 [8,9], is the most well-known association rule discovery method. Clustering. Clusters are patterns that emerge via clustering, which is the division of a dataset into groups of data such that examples belonging to the same group are as similar as feasible and instances belonging to separate groups vary as little as possible [10].

Reinforcement Learning

The term Reinforcement Learning refers to a group of strategies in which the system tries to learn by interacting directly with the environment in order to maximize some kind of cumulative reward [11]. It's worth noting that the system has no previous knowledge of how the world behaves, and that the only way to learn is via trial and error (trial and error). Because of their independence from their surroundings, reinforcement learning is most often used in autonomous systems.

Feature Selection

One of the most crucial steps in the KDD's data transformation stage is feature selection. It is described as the process of picking a subset of characteristics from the feature space that are more relevant and informative for the model's creation. The benefits of feature selection are many and relate to several elements of data analysis, including improved data visualization and comprehension, reduced computational time and analysis length, and improved prediction accuracy [12,13].

Diabetes Mellitus (DM) is a set of metabolic illnesses characterized mostly by impaired insulin secretion and/or action [14]. Hyperglycemia (high blood sugar) and poor carbohydrate, lipid, and protein metabolism are the outcomes of insulin insufficiency. Diabetes mellitus (DM) is one of the most prevalent endocrine diseases, affecting about 200 million individuals globally. In the future years, the number of people diagnosed with diabetes is expected to skyrocket. There are a few different varieties of DM. According to the etiopathology of the condition, there are two primary clinical kinds of diabetes: type 1 diabetes (T1D) and type 2 diabetes (T2D). T2D seems to be the most frequent type of diabetes (90 percent of all diabetic patients), with insulin resistance being the major symptom. T2D is supposed to be caused by autoimmune destruction of the Langerhans islets that house pancreatic cells, while T1D is believed to be caused by lifestyle, physical activity, dietary preferences, and inheritance. T1D affects around 10% of all diabetic individuals globally, with 10% developing idiopathic diabetes as a result. Gestational Diabetes, endocrinopathies, MODY (Maturity Onset Diabetes of the Young), neo-natal, mitochondrial, and pregnancy diabetes are other types of diabetes that are characterized based on insulin secretion profile and/or onset. Polyuria, polydipsia, and considerable weight loss are only a few of the signs of diabetes mellitus. Blood glucose levels (fasting plasma glucose = 7.0 mmol/L) are used to determine the diagnosis [15].

Chronic hyperglycemia, which is a major cause of DM development, is connected to a number of problems. The fact that DM encompasses a broad spectrum of pathophysiological disorders is widely established. Diabetic nephropathy, retinopathy, neuropathy, diabetic coma, and cardiovascular disease are some of the most prevalent consequences. Because of the high mortality and morbidity associated with diabetes mellitus, as well as related illnesses, prevention and treatment are of great interest. Insulin therapy is the most common treatment for T1D, while it is also used in T2D patients whose hyperglycemia cannot be managed with diet, weight reduction, exercise, or oral medicine. Current medications are largely aimed at a) preserving one's life and reducing illness symptoms, and b) preventing long-term diabetes complications and/or eliminating many risk factors, hence extending one's life span. Sulfonylureas, metformin, alpha-glucosidase inhibitors, peptide analogues, non-sulfonylurea secretagogues, and other anti-diabetic medications are among the most often used anti-diabetic drugs [16]. However, the bulk of today's anti-diabetic medications include a slew of negative effects. Insulin treatment has also been linked to weight gain and hypoglycemia. As a result, anti-diabetic medication development and design is a major issue as well as a research problem [17–20].

Despite the fact that extensive research in DM has yielded significant knowledge on the a) etiopathology (genetic or environmental factors and cellular mechanisms), b) treatment, and c) screening and management of the disease over the past decades, there is still much to be discovered, unraveled, clarified, and delineated. Diagnoses, prognosis evaluations of relevant treatments, and clinical administration might all benefit from such procedures. Reliance on a substantial and rapidly growing corpus of research and clinical data serves as a

crucial foundation for safe diagnosis and follow-up therapy in such an attempt. As a result, data mining and machine learning emerge as important procedures that help clinicians make better decisions. As a result, the goal is to relate data analysis to medication administration diagnosis and decision-making.

3. METHODS

There was a lot of work put in to find papers on diabetes research that used machine learning and data mining approaches. The DBLP Computer Science Bibliography, which contains more than 3.4 million journal articles, conference papers, and other publications on computer science (July 2016) [21], and PubMed, which is widely used in biological sciences, were both searched (15 July 2016). The use of DBLP was motivated by the fact that some high-impact international scientific publications in the area of computer science are not indexed by PubMed, despite the fact that the suggested published techniques are often applied to biological information.

The phrases machine learning and data mining have a tight connection, with the latter being more generic. Machine learning techniques are often referred to as data mining techniques in scientific literature. To get around this, two PubMed searches were run using the following queries: a) "Machine Learning" AND "Diabetes" (QUERY 1), and b) "Data Mining" AND "Diabetes" (QUERY 2). DBLP searches simply the title of an article, whereas PubMed searches the title, abstracts, and keywords. Because machine learning and data mining are too wide phrases to be discovered on a computer science publication title, DBLP searches were narrowed to the "Diabetes" query (QUERY 3).

4. DM THROUGH MACHINE LEARNING AND DATA MINING

A variety of variables are known to have a role in the onset and course of diabetes mellitus. Obesity is a key risk factor, particularly in T2D, because to the strong causal link between obesity and the start of DM [22]. The glycogen hemoglobin (A1C) test, random blood sugar test, fasting sugar test, or oral glucose tolerance test are all used to diagnose diabetes. There is evidence that early identification and prediction of disease beginning are critical in both T1D and T2D for a) slowing disease development, b) targeted drug selection, c) increasing life expectancy, symptom relief, and d) preventing associated consequences.

Biomarkers (for example, biological molecules) are quantifiable indications of a certain condition, such as health or sickness. Biomarkers are often a) assessed in bodily fluids (blood, saliva, or urine), b) discovered and therefore identified irrespective of their etiopathogenic mechanistic route, and c) utilized to track clinical and subclinical disease load and treatment response. Biomarkers may be direct or indirect indicators of additional problems. Current technologies like metabolomics, proteomics, and genomes have aided in the creation of a slew of novel biomarkers. Biomarkers for diabetes mellitus (DM) may reflect the existence and severity of hyperglycemia, as well as the presence and severity of accompanying comorbidities [23].

The present part is split into two major categories: a) diagnostic and predictive markers are used, or novel biomarkers are introduced, and b) illness prediction, however this work is always undertaken to assess the predictive accuracy of the detected biomarkers.

Diagnostic and Predictive Markers

The first is biomarker discovery [24–34], which is mostly accomplished via feature selection approaches. A classification method is used to evaluate the prediction accuracy of the chosen features after a feature selection phase.

To begin, the biomarker evaluation problem was addressed using well-established approaches. [25] examined various standard feature selection techniques (including wrapper and filter approaches) to predict DM using a clinical dataset of 803 prediabetic females with 55 characteristics. They came to the conclusion that wrapper approaches provided the greatest overall performance. Furthermore, symmetrical uncertainty outperformed the other filter techniques in terms of accuracy of prediction. Georga et al. [28] used existing approaches to examine a variety of characteristics' capacity to predict short-term subcutaneous glucose concentrations, utilizing Random Forest (RF) [35] and RReliefF [36]. The authors of [31] used GC/MS profiling in conjunction with Random Forest to investigate correlations between the 5'-AMP-activated protein kinase AMPK and DM. In case HbA1c levels are below or equal to the existing cut-off of 6.5 percent, Jelinek et al. [24] looked into whether other biomarkers may be utilised in conjunction with HbA1c to increase diagnosis accuracy in T2D. They came to the conclusion that the oxidative stress marker 8-hydroxy-2-deoxyguanosine (8-OhdG) and interleukin-6 (IL-6) improved classification accuracy.

In order to deal with characteristics in diabetic patient data, new strategies have been presented. For feature selection, a new electromagnetism-like mechanism (IEM) method was presented [26]. As the local search, it employs the electromagnetism-like mechanism (EM) method in conjunction with the closest neighbor classifier [37] and the opposite sign test (OST) [38]. In [33], an entirely new technique is presented for dealing with characteristics in a diabetic clinical dataset. Without previous knowledge of the probability distribution, the authors employed genetic programming to create new characteristics from existing ones. Using illness diagnostic information, Sideris et al. suggested a unique feature extraction method based on clustering (hierarchical clustering). Their approach resulted in clusters that might be employed as characteristics for predicting patient severity of condition and readmission risk.

Finally, there was a presentation on high-dimensional data. When working with high-dimensional data, such as genetic data, feature selection becomes very difficult. Cai et al. used an iterative sure independence screening (ISIS) technique to identify 48/24 meta-markers for gene profiles acquired from metagenome sequencing in Chinese and European populations, reaching 0.97/0.99 accuracy.

5. DISCUSSION

The latest literature on machine learning and data mining approaches in diabetes research was evaluated in the current study. The first two sections briefly outline the two primary research domains involved (machine learning, knowledge discovery in databases, and diabetes), emphasizing the importance of intelligent applications in increasing the quality and efficacy of DM decision-making.

Following the creation of the assembled article collection (for methodology details, see *supra*), each article was categorized into one of the title groups (descending number of papers), thus covering a wide range of important diabetes research fields, including Biomarker Prediction and Diagnosis in DM, Diabetic Complications, Drugs and Therapies, Genetic Background and Environment, and Health Care Management. The present research was published in a number of scholarly publications covering a variety of topics, including bioinformatics, biomedical engineering, and diabetes. In Figure 4, scientific journals are shown in the order in which they occur in the current collection, while article classification was done based on the content of the retrieved articles. The most popular category was Biomarker Prediction and Diagnosis of Diabetes Mellitus, which focused on attempts to identify and propose new biomarkers, as well as forecast essential characteristics of the illness, such as start. The resulting gaps and constraints in machine learning research in DM are intimately tied to the availability of data, since the performed re- search reflects a data-driven process.

Potential benefits of early detection of a disease, in this case DM, in addition to the assessment of possible risk factors, include: a) significant prolongation and quality of life, as a result of reduced severity and frequency of a disease state and/or prevention and delay of its complications, and b) cost savings in health care, as a result of reduced care linked to patient hospitalization. Data mining and machine learning emerge as crucial processes in this context, offering insight into probable links between molecules and situations such as gene–gene, protein–protein, drug–drug, drug–disease, or gene–disease, and so on.

Although there are various forms of diabetes, the overall findings show that the publications analyzed are about T1D and T2D, with T2D accounting for the bulk of the articles. Only one article discusses the metabolic syndrome, which is a term for pathology linked to metabolism. Clinical, genetic, electrochemical, chemical, and medicinal data were all employed in the current collection. Clinical data was combined with genetic data in just a few papers. Furthermore, the great majority of the publications examined exclusively clinical datasets. Anthropometric measures, demographic variables, recognized risk factors, medical and drug history data, laboratory measurements, and epidemiological data are among the most often utilized bio-markers in prediction. Blood glucose levels (HbA1c) seem to be the most often used biomarker, which is not surprising given that their detection is the first step in diagnosing and classifying a diabetic patient.

In terms of DM treatment, the articles on drugs and therapy cover a variety of topics, including a) medication prescriptions, b) dosage planning with an emphasis on insulin administration, c) potential side effects of non-diabetic medications (e.g. statins), and d) prediction of personalized glycemic response after anti-diabetic medication. Only Shoombautong et al. deal with the identification of new anti-diabetic drugs in [119]. As a result, we believe there is still a lot of work to be done in terms of pharmacological and therapy protocol creation, as well as assessment and data mining on already-known blood glucose lowering variables like metformin.

In terms of the genetic background in diabetes and environmental factors influencing the start and course of the illness, it's worth mentioning that the current account highlights a clear deficit in diabetes research in terms of

data mining and machine learning. The HLA gene complex is used in connection to T1D in the publications evaluated, whereas the remainder seek to anticipate pleiotropic gene relationships with diabetes. Lopes et al., for example, attempted to link two known genes to DM using wet lab validation. Finally, despite the fact that SNPs are one of the most widely used genetic markers in a variety of domains, just two studies in our analysis used SNPs to predict diabetes. As additional genes implicated in diabetes pathogenesis are discovered, it will be simpler to obtain a better understanding of the processes that cause the illness to develop and advance. This might lead to new discoveries about diabetes' genetic epidemiology and the nature of gene–gene and gene–environment interactions.

Finally, nephropathy, Alzheimer's disease, diabetic foot, liver cancer, hypoglycemia episodes, heart disease, depression, and retinopathy are among the diabetes consequences explored in this research. Retinopathy is the subject of the vast bulk of the articles. Apart from the disease's effect, one probable explanation is the availability of data resources from ordinary clinical practise that enable information extraction.

6. CONCLUSIONS

The goal of this work was to find and evaluate machine learning and data mining methodologies used in DM research. Diabetes mellitus (DM) is quickly becoming one of the world's most pressing health problems in the twenty-first century. To date, considerable work has been done in almost every facet of DM research, including biomarker discovery and diagnostic prediction. The use of machine learning and data mining techniques in enriched datasets that include clinical and biological information is expected to lead to more in-depth exploration of the diagnosis, etiopathophysiology, and treatment of DM as a result of the advent of biotechnology and the vast amount of data produced, as well as the growing number of EHRs.

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Pharmacognostic and Antimicrobial Potentials by Disc Diffusion Method of *Gloriosa Superba*

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ABSTRACT

This study was conducted to evaluate the Pharmacognostic and antimicrobial potentials of ethanol: water, ethanol, water, methanol: water, and acetone water extracted samples from the tuber parts of *Gloriosa Superba* against *Candida albicans*. In quantitative analysis by TLC it was observed that methanolic extract and water showed highest R_f value 0.92 and ethanolic extract showed lowest R_f value 0.64. The antifungal susceptibility was screened by disc diffusion assay. The extracts were applied in different concentrations of 20, 40, 60, and 80 µg/ml. Analysis of the data revealed that all the five extracts from *Gloriosa Superba* showed different ranges of antimicrobial activities. Ethanol: water, fraction showed inhibitory activities against *Candida albicans*.

Keywords: Pharmacognostic, Antimicrobial, potential, *Gloriosa Superba*, disc diffusion.

INTRODUCTION

Almost every plant has medical properties, but herbs have numerous uses in human health. Herbs are known for their low toxicity and absence of build-up in the body. For ages, many plant natural products have been a key source of medicine, with medicinal plants accounting for around a quarter of today's pharmaceuticals. According to the World Health Organization, 75 to 80 percent of the world's population used plant medicines for health treatment, either partially or totally. Herbal therapies have been promoted by the World Health Organization as a means of delivering affordable primary health care and building agricultural markets for underdeveloped countries. Traditional medicine is practiced all over the world in China, India, Japan, Pakistan, Sri Lanka, and Thailand. Traditional tribal medicines contribute to around 40% of the total medicinal demand in China. [1]. In Pakistan, the Unani system is dominant, but ethnomedicinal species are also used in rural areas [2]. India is the world's leading producer of medicinal herbs and is rightly recognized as the world's botanical garden [3]. Antibiotic resistance is on the rise, prompting researchers to look for better, more effective, inexpensive, and accessible treatments [4].

Traditional and modern medications, nutraceuticals, nutritional supplements, folk remedies, pharmaceutical intermediates, and chemical entities for synthesized pharmaceuticals are all found in medicinal plants [5]. Antibiotic resistance is on the rise, prompting researchers to look for better, more effective, inexpensive, and readily available treatments. Traditional medicines, modern medications, nutraceuticals, food supplements, folk remedies, pharmaceutical intermediates, and chemical entities for synthesized pharmaceuticals are all found in medicinal plants [6]. *Candida*-related infections, as either topical applications or oral drugs. Even though they are widely acclaimed for their efficacy, then drugs are known to have side effects [7, 8]. Fluconazole, commonly used to treat various *Candida albicans* infections, is fungistatic and there are reports of emerging resistance among clinical isolates of *C. Albicans* [9]. Therefore, there is a need to isolate new antifungal agents, mainly from plant extracts, intending to discover new chemical structures without the above disadvantages [10].

Many plant extracts and essential oils have biological activity both in vitro and in vivo, which has justified research in traditional medicine focused on the characterization of their antimicrobial activity [11].

The antimicrobial activity shown by *Gloriosa Superba* is mainly due to alkaloids having antifungal activity. In addition, it is expected that plant compounds with target sites other than those currently used by antimicrobials will be active against drug-resistant microbial pathogens. Yet, the information available regarding plants (particularly medicinal plants) that are active against this microorganism has, until recently, not resulted in effective formulations for human use. For this reason, the present study assessed *Gloriosa Superba* tuber extract against *C. albicans* by standard disc diffusion assay by agar dilution and macro broth dilution assays.

MATERIALS AND METHODS

Collection of Plant Material

The field study was carried out at Prashivani Tah Savner Dist Nagpur Country India (25°18' N, 83°50' E). The experimental location experiences a semi-arid tropical climate. The soil of the experimental field was sandy

loam texture; organic Electrical conductivity 0.42 d Sm⁻¹ available carbon 0.38 %, available nitrogen 180 kg ha⁻¹, available phosphorus 21 kg ha⁻¹ pH 7.3. Plants used in the study were propagated from its underground, V-shaped tuber. The tubers were planted in the first week of July 2020 at a depth of 6- 8 cm, keeping a plant-to-plant distance of 30 to 40 cm. After six months, Plants were harvested from the field. The arial and tuber parts of the plants were separated and the tubers were washed with tap water, the shade of the plants was separated and the tubers were washed with tap water, shade dried, and kept in cellulose bags for further experiment.



Fig 1: Preparation of plant for pharmacognostic evaluation.

Analytical specification of *Gloriosa superba* :

Test of extraneous materials:

1) Determination of foreign organic matter

100 gm of the sample was weighed and spread on a white tile or glass plate uniformly without overlapping. Inspected the sample with naked eyes using the lens of 5X magnification power or above. The foreign organic matter other than the sample (if any) was separated After completed separation the matter separated was weighed and foreign organic matter in terms of percentage/w present in the sample was determined.

2) Determination of insect-infested matter

100 gm of sample is weighed and spread on a white tile or glass plate uniformly without overlapping. Inspected the sample with naked eyes using a lens of 5X magnification power or above. The holed, ruptured, deteriorated, insect-infested organic matter was separated. After complete separation weighed and determined the foreign organic matter in terms of percentage w/w, present in the sample.

Physico-chemical Analysis of *Gloriosa superba*

1) Determination of moisture content/ loss on drying

2 gm of the powdered test sample was weighed. It was then placed in a china dish and dried in an oven at 100-105C. The sample was taken out, it was cooled in desiccators, and loss in weight was recorded. This procedure was repeated till constant weight was obtained.

Loss on drying (%) = Loss in weight x 100/w

Where W is the weight of the drug powder in gram

2) Determination of total Ash value

2 gm of the weighed test sample was taken in a tared platinum or silica crucible, previously ignited, and weighed. The powdered sample was scattered at the bottom of the crucible. The muffle furnace was incinerated by gradually increasing the temperature to 450 C or heat should not exceed the dull redness of the material i.e. until the sample powder was free from carbon. Then cooled in a desiccator. The ash was weighed and the percentage of ash is calculated concerning the air-dried drug sample

Ash value (%) = 100 x wt of ash/wt of sample

3) Determination of acid-insoluble ash value

Using 25 ml of dil HCl (0.5 N) the ash from the dish used for the total ash value determination was washed into a beaker. Wire gauze was placed over a Bunsen flame and the washed HCl was boiled for 5 min. Filtered through ash-less filter paper. The muffle furnace was incinerated to 200 C. Then cool it and the residue was weighed The acid-insoluble ash of the crude drug concerning air-dried sample of the crude drug was calculated

Acid insoluble ash value 9%) = 100 X wt of residue / wt of sample

4) Determination of Alcohol soluble extractive value for both samples

About 5 gm of the powdered drug was weighed in a beaker and transferred to a dry 250ml iodine flask. 100 ml graduated cylinder was filled to the required mark with the solvent 90% alcohol. The flask was stoppered and set aside for 24 hours shaking frequently at the interval of 6 hours (maceration). Filter into a 50ml cylinder after sufficient filtrate has collected transfer 25 ml of the filtrate to a weighed 25 ml beaker. Evaporated to dryness on a water bath and complete the drying in an oven at 1000 C for about 10-15 minutes. Cooled in desiccators and weighed. The percentage w/w of extractive was calculated regarding the air-dried drug[12].

Selection of solvent

Several solvents were used to extract *Gloriosa superba* tubers, i.e. water, ethanol, acetone, 50 % aqueous ethanol, and 50 % aqueous acetone.

Extraction

Extraction of rhizome of *Gloriosa superba* was carried out by standard operating procedures of continuous hot soxhlation method by using several solvents.

Instrumentation

- 1) Soxhlet Apparatus
 - a) Thimble-400ml
 - b) Reflux condenser
 - c) 2 rubber pipes (inlet and outlet)
 - d) 1 lit Round bottom flask
- 2) Heating Mantle – 1 lit Capacity

Other materials: a) Filter paper b) 500ml beaker c) Glass funnel

Ingredients: Bark powder 50gm

Principle

Extraction involves the separation of the bioactive portion of the plant tissues from the inactive components by using a selective solvent in standard extraction. The process at a temperature approximately that of the boiling point of the solvent Soxhlet apparatus permits the uniform percolation of the drug and the continuous flow of vapor of the solvent around the percolator is best for this type of extraction. The process is generally applied to the removal of natural products from dried tissues originating from plants, fungi, etc. The downstream volatile compounds may be removed by solvent extraction using a batch or continuous process. For the continuous extraction of a solid by a hot solvent it is better to use a soxhlet apparatus.

Procedure

Part 1

The solid substance (powdered drug) was placed in a porous thimble and the latter was placed in the inner tube (thimble) of the Soxhlet apparatus. The apparatus was then fitted to a round bottom flask of appropriate size containing the boiling chips and then to a reflux condenser (preferably of the double surface type)

Before joining the condenser or even after joining, pour the solvent into the thimble slowly and fill it. Then the thimble was allowed to soak along with the solvent overnight. Then next day solvent was poured and filled in a round bottom flask with the appropriate quantity of solvent. Then the solvent was boiled gently, the vapor passes up through the tube and was condensed by a condenser, and then the condensed solvent falls into the thimble and slowly fills the body of Soxhlet. When the solvent reaches the top of the tube, it siphons over into the flask and this portion of a substance, which it has extracted, gets collected in the round bottom flask. The process was repeated automatically until complete extraction was affected. Fifteen to eighteen hours were needed for the complete extraction of constituents.

Part 2

After extraction, the solvent in the round bottom flask was collected in a beaker and then evaporated. The extract was then concentrated in the hot water bath and finally reduced to dryness (or till the alcohol smell was lost completely). After drying the respective extract was weighed and the yield recorded. The physical characteristics were noted [13].

Alkaloid Estimation:**TLC identification tests**

TLC fingerprinting was done for 5 different extracts of *Gloriosa superba*. 50% aqueous ethanol, water, ethanol, 50% aqueous methanol, and 50% aqueous acetone.

Methodology**Sample preparation**

0.2g of each extracted sample were diluted to 10 ml of methanol separately and used for TLC.

Solvent system used

Stationary phase: Silica gel G

Mobile phase - Chloroform: Methanol (9: 1)

Procedure

10 μ of each of the diluted test solutions were applied on a pre-coated silica gel G TLC plate of uniform thickness of 0.2mm. The plate was developed in the solvent system of the mobile phase to a distance of 9 cm.

Visualization

The plate was observed under UV light at 254nm and the TLC fingerprint profile was recorded. Different Rf values were noted and compared with the standards.

Fungal strains and inoculum quantification

The selected plant fungal pathogens *C. albicans* were obtained from the P.G Department of Microbiology, Rajiv Gandhi Biotechnology Centre, R.T.M. University, L.I.T. Premises, Nagpur-440033, Maharashtra, India. The selected fungi are important among pathogenic fungi with an economic impact on plants. The fungal strains were retained on TM Media TM 387 Sabouraud Dextrose Agar (SDA) which was obtained from PG Micro Lab Solution LLP, Bhiwadi-301019, Rajasthan, India. Amended hemocytometer cell counting was employed for estimating the number of cells in each fungal culture [14]

The inoculum preparation involved in the growth of fungus on SDA slants for 48 hr at 35°C. The slant was shifted to a sterile tube with fresh HiMedia M403 Potato Dextrose Broth (50 ml) obtained from UBUY LLC 1810, Airport Exchange, BLVD STE 300 Erlanger, KY 41018, United States. The sterile tubes were then dazed for 5 min and appropriate dilutions were made to estimate the number of cells by microscopic enumeration with a hemocytometer. The final inoculum concentration was maintained at approximately 1.0 \times 10⁶ cells/ml.

Comparison of *Candida albican* suspension with 0.5 McFarland solution:

Candida albican was aseptically inoculated on SDA plates and incubated at 31 °C for 48 hours. The colonies were suspended in sterilized 0.9 % sodium chloride solution (normal saline) which was compared with 0.5 McFarland solution

Preparation of Potato Dextrose Broth-

24 gm of Potato Dextrose Broth was suspended in 1000 ml purified distilled water. Heat it necessary to dissolve the medium completely. Sterilize by autoclaving at 15 lbs pressure (1210c) for 15 minutes. Mixed well before dispensing. In specific work, when ph 3. 5 was required, acidify the medium with sterile 10% tartaric acid. The amount of acid required for 100 ml of sterile, cooled medium was approximate 1ml

Preparation of Sabouraud Dextrose Agar -

65 gm of **Sabouraud Dextrose Agar** was dissolved in 1000 ml of distilled water. Boil to dissolve the medium completely. Sterilize by autoclaving at 15 psi (1210 c) for 15 min. Cool to 45-50⁰ C. Mixed well and dispense as directed.

Disc Diffusion Assay

The antifungal activity of the *G. Superba* ethanolic extract (1:1) was tested. Sabouraud Dextrose agar plates were prepared and aseptically spread with 50 μ L of 5 \times 10⁶ CFU/ml *C. Albicans* culture. Wells of about 6 mm diameter were made aseptically using borer, *G. Superba* ethanolic extract (30 μ g/ml) was placed in each separate well and incubated at 35°C. The diameter of the zone was measured after 48 hours.

Table 1: Analytical Specification of *Gloriosa Superba*

Sr No	Parameters	Result
1	Foreign Organic matter	1.81
2	Insect infested matter	Nil
3	Sand and Silica	Nil

Table 2: Physico-chemical Analysis of *Gloriosa Superba*

Sr No	Parameters	Result
1	Moisture content estimation	
2	Ash value estimation	4.63%
3	Acid insoluble ash value estimation	0.52%

Table 3: Different solvent extractive values:

Sr No	Solvent	Result
1	Alcohol	2.78%
2	Water	5.36 %

Table 4: TLC of plant extract

Sr No	Solvent	RF in UV light
1	50 % aqueous ethanol	0.87
2	Ethanol	0.64
3	Water	0.92
4	50% aqueous methanol	0.92
5	50% aqueous acetone	0.74

Table 5: Zone of inhibition of *Gloriosa Superba* extract with different solvent concentrations

Sr No	Name of Solvent	Conc of solvent	Zone of inhibition in mm
1	Water	2	7.25
2	Water	4	7
3	Water	6	8
4	Water	8	8.25
5	Ethanol	2	8
6	Ethanol	4	11.75
7	Ethanol	6	12.5
8	Ethanol	8	17.25
9	Methanol	2	7.25
10	Methanol	4	10
11	Methanol	6	10.75
12	Methanol	8	13.25
13	Acetone	2	7.75
14	Acetone	4	8
15	Acetone	6	10
16	Acetone	8	13.5

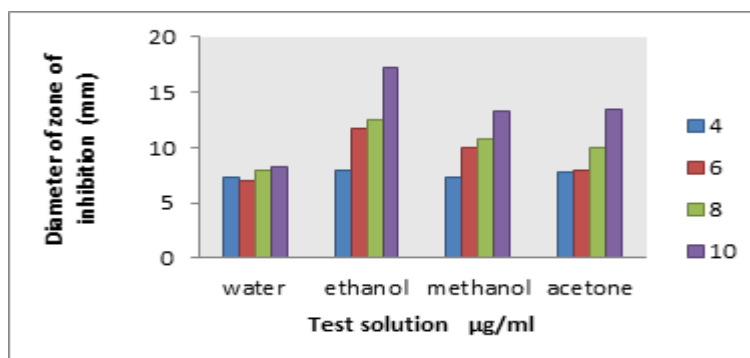


Fig 1: Diameter of zone of inhibition of test solution at 4,6,8 and 10 µg/ml

RESULT:

A pharmacognostic investigation of *Gloriosa superba* was carried out as per standards. In quantitative analysis by TLC, it was observed that methanolic extract and water showed the highest Rf value of 0.92 and ethanolic extract showed the lowest Rf value of 0.64.

Screening of plant extract for anti-Candida activity

Figure 1 shows the anti candida activities of water, ethanol, methanol, and acetone extracted samples against *C. albicans* using the disc diffusion susceptibility assay. Water extract of conc 2,4,6 and 8 µg/ml resulted in 7.25, 7, 8, and 8.25 mm Zone of inhibition. Ethanol extract of conc 2,4,6 and 8 µg/ml showed 8, 11.75, 12.5 and 17.25 mm Zone of inhibition. Methanolic extract of conc 2,4,6 and 8 µg/ml resulted in 7.25, 10, 10.75, and 13.25 mm Zone of inhibition. Acetone extract of conc 2,4,6 and 8 µg/ml showed 7.75, 8, 10, and 13.5 mm Zone of inhibition. The data further revealed that the highest growth inhibition of *C. albicans* was recorded for Ethanol 17.25 at the highest concentrations of 8 µg/ml and the lowest inhibition of *C. albicans* was noted for water at a concentration of 4 µg/ml when compared with other samples' activity.

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Synthesis and Characterization of Schiff Bases Derived from 4-Bromobenzaldehyde with Benzilmonoximethiocarbohydrazone Toward Fe(II), Ni(II) And Co(II) Ions

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ABSTRACT

A novel Schiff base chain derived derivatives of benzilmonoximethiocarbohydrazone-4-bromobenzaldehyde complexes made up of condensation of Fe(II), Co(II), and Ni(II) ions yielded derivatives of these ions 4-bromobenzaldehyde and benzilmonoximethiocarbohydrazone. All synthesized complexes were structurally determined by elemental analysis (UV, FT(IR), and PMR). Electrical conductance data suggests that, nature, all complexes are non-electrolytes.

Keywords: Schiff base, 4-bromobenzaldehyde, benzilmonoxime, thiocarbohydrazone, Schiff base complexes

1. INTRODUCTION

Thiocarbohydrazone molecules generated from Schiff bases are an important class of management science with a wide variety of applications in various domains [1]. Schiff bases, which are derived from thiocarbohydrazides, are widely used bidentate ligands that can be coordinated in neutral forms. Thiocarbohydrazone metal complexes have recently gained prominence due to their anticancer, antifungal, and antibacterial properties [2-3]. El-ajaily et al. [4] investigated the antibacterial properties of the Schiff base, which is generated from salicylaldehyde and cysteine, as well as its Ni (II), Cu (II), Mn(II), Co(II), and Cd (II) complexes, on harmful bacteria[5-10]. The goal of the research is to make Fe(II), Ni(II), and Co(II) thiocarbohydrazone base complexes from the reaction of benzilmonoximethiocarbohydrazone-4-bromobenzaldehyde. Different approaches, including as electronic absorption, FT(IR), and NMR spectra, are used to verify their geometrical structures.

2. EXPERIMENTAL

2.1: Chemicals and Reagents:

All chemicals and reagents used in this study were purchased as laboratory pure from s. d. fine chemical, which include 4-bromobenzaldehyde, hydrazine hydrate, carbondioxide, NaOH, C₂H₅OH, CH₃OH, [FeSO₄], [CoCl₂.6H₂O], [NiCl₂.6H₂O], CHCl₃ and dimethyl sulfoxide (DMSO).

2.2: Preparation of A-Benzilmonoximethiocarbohydrazone-P-Bromobenzaldehyde (Hbmtppbb)

An alcoholic solution of 0.15 mol benzilmonoximethiocarbohydrazone and 2ml of conc. HCl was added to a mixture of 0.10mol p-bromobenzaldehydes in 50mL ethanol. This mixture was allowed to cool after being refluxed for 8 hours. The precipitated chemicals were collected and purified using the methanol crystallisation technique (yield: 80-83 %).

Reaction:

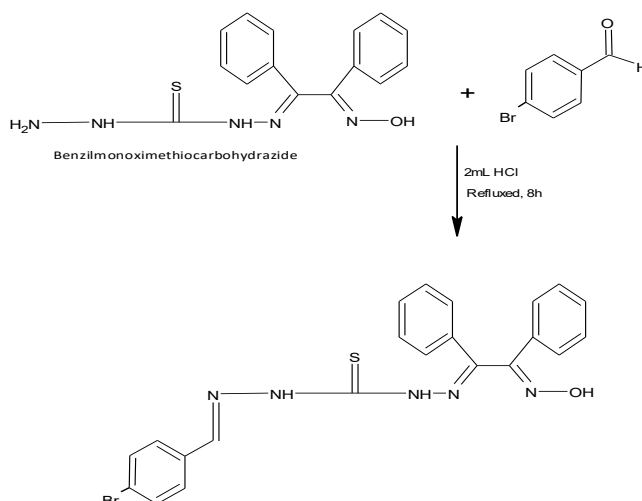


Figure-1: α -benzilmonoximethiocarbohydrazone-p-bromobenzaldehyde preparation

2.3 : Synthesis of Benzilmonoximethiocarbohydrazide-*p*-Bromobenzaldehyde Complexes:

2.3.1: Bis (α -Benzilmonoximethiocarbohydrazone-*p*-bromobenzaldehyde)Ferrous(II), [Fe(BMTpBB)₂]:

A solution of 4.80g (10mmol) of HBMTpBB in 20cm³ ethanol was gradually added with stirring to a solution of 0.76g ferrous sulphate (5mmol) in 10cm³ water. An ink blue coloured complex separated when the pH of the mixture was gently elevated to 6.5 using dilute (0.10N) NaOH. It was filtered before being rinsed in hot water (50cm³) and dried at 110°C. Methanol was used to recrystallized it.

2.3.2: Bis (α -Benzilmonoximethiocarbohydrazone-*p*-bromobenzaldehyde)Cobalt(II), [Co(BMTpBB)₂]:

A solution of 4.80g (10mmol) of HBMTpBB in 20cm³ ethanol was gradually added with stirring to a solution of 0.85g cobalt chloride hexahydrate (5mmol) in 10cm³ water. When the pH of the mixture was gradually raised to 7.5 with dilute (0.10N) NaOH, an orange coloured complex separated, which was digested for 15 minutes on a hot water bath, filtered, washed with hot water (50 cm³), and dried at 110°C. Methanol was used to recrystallized it.

2.3.3. Bis(α -Benzilmonoximethiocarbohydrazone-*p*-bromobenzaldehyde)Nickel(II), [Ni(BMTpBB)₂]:

A solution of 4.46g (1mmol) of HBMTpBB in 20cm³ ethanol was gradually added with stirring to a solution of 0.85g nickel sulphate heptahydrate (5mmol) in 10cm³ water. The pH of the mixture was gradually raised to 7.0 with dilute (0.10N) NaOH, at which point a light green coloured complex separated, which was digested for 15 minutes on a hot water bath, filtered, washed with hot water (50cm³), and dried at 110°C. Methanol was used to recrystallize it.

3. RESULTS AND DISCUSSION

3.1. Microanalysis:

The elemental analysis results of thiocarbohydrazide-based compounds with a 1:2 [M:L] ratio are shown in Table-1. The results are consistent with the theoretical values. The TLC method and elemental analyses (C, H, and N) were used to assess the purity of thiocarbohydrazide-based complexes.

Table-1: Analytical and Physical data HBMTpBB and its metal complexes

Compound	Color	% Yield	MP/DP °C	Elemental Analysis: Expected (Found)						Molar Conductance	Magnetic Moment
				C	H	N	O	S	M		
HBMTpBB	Yellow	73.96	223	55.01(54.89)	3.78(3.70)	14.58(14.51)	3.33(3.29)	6.67(6.60)	-	-	-
Fe(BMTpBB) ₂	Ink Blue	75.33	275	52.07(52.01)	3.35(3.22)	13.81(13.75)	3.16(3.09)	6.31(6.30)	5.51(5.44)	2.88	5.11
Co(BMTpBB) ₂	Orange	71.12	268	51.92(51.88)	3.34(3.29)	13.77(13.72)	3.15(3.11)	6.29(6.20)	5.80(5.81)	1.69	5.01
Ni(BMTpBB) ₂	Green	76.13	277	51.92(51.73)	3.34(3.32)	13.77(13.70)	3.15(3.12)	6.29(6.22)	5.80(5.80)	0.18	3.31

1.3 : Electronic spectra:

In chloroform solution, the electron absorption spectra of ink blue [Fe(BMTpBB)₂] reveal a symmetrical broad band around 720nm (= 958 dm³/mol/cm), as well as a small band at approximately 621nm (= 2954 dm³/mol/cm). The orange [Co(BMTpBB)₂] complex in chloroform solution exhibit bands at 589nm ($\epsilon = 988$ dm³/mol/cm) and 522nm ($\epsilon = 1242$ dm³/mol/cm). In chloroform solution, the electronic spectrum of the light green Ni(II) complex reveals a peak at 975nm ($\epsilon = 10$ dm³/mol/cm) and 610nm ($\epsilon = 1568$ dm³/mol/cm) [11].

Table-2: HBMTpBB and its metal complexes electronic absorption spectra

Compound	Solvent	λ_{nm}	ϵ	Transition
HBMTpBB	Methanol	306	5068	Oximino $\pi \rightarrow \pi^*$
		257	13513	Azomethine $\pi \rightarrow \pi^*$
		215	13581	Azomethine $\pi \rightarrow \pi^*$
Fe(BMTpBB) ₂	Chloroform	720	958	$^5T_{2g} \rightarrow ^5E_g$
		62	2954	$^5E_g \rightarrow ^5B_{1g}$
Co(BMTpBB) ₂	Chloroform	589	988	$^4T_{2g}(F) \rightarrow ^4A_{2g}$
		522	1242	$^4T_{1g}(F) \rightarrow ^4T_{1g}(P)$
Ni(BMTpBB) ₂	Chloroform	975	10	$^3A_{2g} \rightarrow ^3T_{2g}$
		610	1568	$^3A_{2g} \rightarrow ^3T_{1g}$

3.2: Infrared spectra:

The absence of any absorption band owing to the O-H vibration, such as O-H, at 3404cm^{-1} in the spectrum of HBMTpBB, is a characteristic feature of the infrared spectra of all divalent metal complexes on KBr discs. The fact that all of the complexes are insoluble in weak alkali solutions, showing that they lack free oxime function, backs up this theory.

N-H stretching vibration may be responsible for the medium intensity bands found in metal complexes in the range $1468\text{-}1500\text{cm}^{-1}$. In the ligand HBMTpBB [12], though two type of C=N linkages are present. As has been discussed earlier, this indicate that both the C=N groups possess nearly similar vibrational energies possibly due to high degree of conjugation present in the ligand. Complexation with the metal ion perturbs the two C=N linkages to different extent, as a result, in the metal complexes two absorption band are observed around $1632\text{-}1638\text{cm}^{-1}$ and $1577\text{-}1586\text{cm}^{-1}$. It is tentatively proposed that these are caused by the azomethine C=N and the oxime C=N cations, respectively. Such an assignment is based on the reported increase in the azomethine ($\nu\text{C=N}$) stretching frequency in the Ni(II) complexes and the observation that in many complexes of carbonyl oximes and imino-oxime, the oximino C=N vibrations appear around $1550\text{-}1577\text{cm}^{-1}$.

All metal complexes of HBMTpBB show medium intensity bands at $1250\text{cm}^{-1}\text{-}1261\text{cm}^{-1}$, which may be ascribed to N→O vibration. No intense band observed [13] in the range $1100\text{cm}^{-1}\text{-}1200\text{cm}^{-1}$ due to N-O vibration, would imply chromospheres of the M-N₆ type with a symmetrical five-membered ring configuration. The proposed five membered ring structures would require the appearance of metal-nitrogen vibrations in these complexes' infrared spectra. Over a wide range of frequencies, M-N vibrations have been observed ($200\text{-}650\text{cm}^{-1}$). The metal complexes of isonitrosopropiophenone shows M-N vibration in the region around $505\text{-}515\text{cm}^{-1}$. Therefore, the band at $512\text{-}527\text{cm}^{-1}$ in these complexes may be suggested as due to the $\nu\text{M}\rightarrow\text{N}$ vibrations frequencies.

Table-3: The ligands and their metal complexes FT(IR) spectral bands (cm^{-1})

Compounds	-OH	$\nu(\text{N-H})$	ArC-H	$\nu(\text{C-S-H})$	$\nu(\text{C=NO})$	$\nu(\text{C=NN})$	$\nu(\text{N-O})$	>C=S	Benz ring	M-N
HBMTpBB	3404	3290	3235	1494	1559	1609	992	1256	741	--
[Fe(BMTpBB) ₂]	-	3300	3232	1494	1578	1632	990	-	741	515, 455
[Co(BMTpBB) ₂]	-	3295	3214	1491	1577	1638	965	-	741	521, 449
[Ni(BMTpBB) ₂]	-	3282	3233	1487	1586	1634	990	-	742	500, 515

3.3: PMR spectra:

The benzilmonoximethiocarbohydrazide-p-bromobenzaldehyde PMR spectra data that was recorded in DMSO-d₆ shows signals at 11.59 ppm that is corresponding to -OH proton of oximino oxime. The multiplet signals 7.60-8.44 ppm are caused by aromatic protons. Another signals shows at 8.50, 8.57 and 9.00ppm that corresponds with secondary amine and -CH groups respectively [14-15].

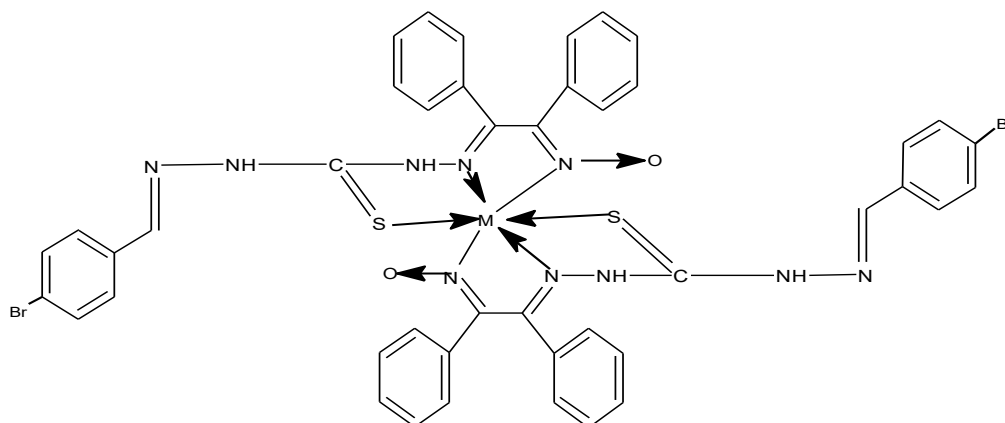
Table-4: PMR data of α -Benzilmonoximethiocarbohydrazide-p-bromo-benzaldehyde in ppm

Compounds	-OH	>C=N-NH-	-SH/-NH	-CH=	Phenyl rings
HBMTpBB	11.59	8.50	8.57	9.00	7.60-8.44

4: CONCLUSION

Basic analysis, FT(IR), electronic absorption, and PMR were used to generate and analyse Schiff base benzilmonoximethiocarbohydrazide and 4-bromobenzaldehyde complexes. The HBMTpBB ligand is water insoluble but soluble in dilute alkali and other organic solvents. The fact that its metal complexes are insoluble in dilute alkali shows that the oxime group is deprotonated during complex formation. Metal complexes all have high decomposition points, implying that they are thermally stable. Non-electrolytic metal complexes exist in all forms [16]. Fe(II), Co(II), and Ni(II) are high spin octahedral, according to spectral and magnetic moment measurements. According to FT(IR) spectrum data, all complexes only coordinate with metal ions through the nitrogen atom[17].

The proposed structure of all divalent metal complexes of HBMTpBB follows;



Where M = Fe(II), Co(II) and Ni(II)

CONFLICT OF INTEREST

The authors declare that the publication of this paper does not involve any conflicts of interest.

5. REFERENCES

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The Role of Work-Life Balance of Female Professionals in Improving Organizational Productivity with Reference to Healthcare Industry in Bihar

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ABSTRACT

Work-life balance refers to how much time an individual devotes to work and other elements of their life. Someone who works a lot of overtime and neglects most of their personal goals does not have a healthy work-life balance. Instead, a healthy balance is one in which individuals are effective at work while still making time for their own needs from outside work. The concept of a single male earner in a family has evaporated, and we can now witness a fundamental change in the definition of family. In India, there has been a significant shift due to dual-earner couples, single parents, and the breakdown of the unified family model. Today's employee has a number of responsibilities: to his or her family, to their employer, to their social interests, and to society as a whole. Employees sometimes forget or abandon their obligation to themselves during the entire cycle. The organizational view on work-life balance, on the other hand, is diverse. This study is the result of continuing research at some of the top most Health Care Centres in Bihar. The goal of this study is to learn more about the organization's HR procedures, with a focus on employee Work-Life Balance. The report investigates several elements of work-life balance at Health Care Centres in Bihar and proposes certain methods aimed at minimizing work-family conflict and thereby enhancing work productivity.

Keywords: Work –Life Balance, Work- family conflict, Health Care Centres

INTRODUCTION

Work-Life Balance relates to a person's level of prioritization of personal as well as professional aspects of one's life, and also the extent to which work is done at home. It's a subject that's grown increasingly relevant for both employers and employees. Work-life balance necessitates a methodical balancing of professional and personal obligations. It is the ability to effectively handle a variety of tasks at work, at home, and in other areas of one's life.

Work-family life relationships, as well as the influence each has on the other, are raising more anxiety than ever before. The earliest studies on this subject were conducted in the early 19th century. The world of work has evolved significantly throughout time, including employment, its nature, needs, and employee-employer interactions. As a result, an employee's capacity to dedicate 100 percent of his or her attention to his or her family has moved. Job demands, work hours, competition, lifestyle and demographic considerations, and women's greater employment rates have all contributed to the growing need for a clear policy and well-designed programmes to promote work-life balance.

Work-Life Balance's major features are life pleasure and job satisfaction. It's critical to strike a healthy balance between one's personal and professional lives. Job satisfaction is a key component of overall pleasure, and it can only be achieved if employees are able to achieve a work-life balance. Medical professionals have an increasingly challenging job since their selfless and committed service has a significant influence on patients' lives. Professionals in the healthcare industry must always be careful. As a result, medical personnel are under a lot of stress. In the event of an emergency, doctors and nurses must respond to their patients during extended working hours, irrespective of whether their kids or dependents are at home. They may have irregular working time, overnight shifts, and other responsibilities that affect their WLB. Despite the fact that WLB is one of the most common issues faced by female medical workers, women make up a significant share of the hospital workforce. They can be balancing several responsibilities in their life, as well as their professional and personal life. This might have a negative impact on their health and well-being. Women who have more tasks, on the other hand, experienced better physical and mental health than women with fewer responsibilities. A reverse link, wherein personal stress impacts professional performance, can also cause role conflict. Women in medicine confront several hurdles in their careers, including prejudice, lack of aid, discrimination, intimidation, and pestering, coworker conflict, office politics, and so forth. As a result, it is critical to provide an appropriate working environment, a flexi - work schedule, and supportive family to guarantee that their needs are met, resulting in improved job satisfaction and leading medical services. This study is the product of ongoing research at some of Bihar's top most health care facilities. The purpose of this research is to learn more about the company's HR procedures, with a particular focus on employee Work-Life Balance. The paper looks into

numerous aspects of work-life balance at those Health Care Centers and suggests some methods for reducing work-family conflict and thereby increasing productivity.

OBJECTIVES OF THE RESEARCH

[A] Understanding the organization's HR processes, with a focus on Work Life Balance.

[B] To study the difficulties that employees in a Health Care Centres encounter in preserving a work-life balance and to offer solutions.

[C] The third objective of the research would include employing a tested instrument to assess work-life balance in the Health Care Centres of Bihar in order to improve organizational effectiveness.

A BRIEF REVIEW OF THE WORK ALREADY DONE IN THE FIELD

- Azeem, S. M., & Akhtar, N. (2014). in their research paper "The influence of work life balance and job satisfaction on organizational commitment of healthcare employees". *International journal of human resource studies*, 4(2), 18. shows how perceived work-life balance and job satisfaction affect organisational commitment among healthcare workers. It was projected that perceived work-life balance encourages job satisfaction, which leads to long-term employee engagement to the business.
- Lazar, I., Osoian, C., & Ratiu, P. I. (2010). "The role of work-life balance practices in order to improve organizational performance." The goal of this article is to see if work-life balance programmes and practises can be regarded strategic human resource management initiatives that lead to better individual and organisational performance. The findings of several research examined in this paper demonstrate the effects and advantages of applying worklife balance policies for people, their families, companies, and society.
- Poulouse, S., & Sudarsan, N. (2017). Assessing the influence of work-life balance dimensions among nurses in the healthcare sector. *Journal of Management Development*. The goal of this study is to look at the impact of work-related elements including high workload and work support on work-life balance (WLB) parameters and their impact on job satisfaction, especially among South Indian nurses in the healthcare industry.
- Soomro, A. A., Breiteneker, R. J., & Shah, S. A. M. (2018). Relation of work-life balance, work-family conflict, and family-work conflict with the employee performance-moderating role of job satisfaction. *South Asian Journal of Business Studies*. The goal of this study is to look into the connections between work-life balance, work-family conflict, and family-work conflict, as well as assessed performance of employees, using job satisfaction as a moderating factor.
- Beauregard, T. A., & Henry, L. C. (2009). Making the link between work-life balance practices and organizational performance. *Human resource management review*, 19(1), 9-22. According to the study, the business case approach should be updated to include a variety of other ways that work-life balance policies may affect organisational performance, such as better social exchange procedures, cost savings, productivity, and attrition reduction.
- Konrad, A. M., & Mangel, R. (2000). The impact of work-life programs on firm productivity. *Strategic management journal*, 21(12), 1225-1237. The study dictates that when women made up a bigger proportion of the workforce and a higher number of professionals were employed, it is found that work-life programmes had a stronger beneficial influence on productivity.
- Suganthi, K.V. and Kumar, G. V (2018), in their research paper "A comparative study on the work-life balance of the nurses in Government and Private hospitals in Thiruvallur District", attempts to analyze work-life balance of nurses in government and private hospitals in Thiruvallur district. This comparative study highlights that there is a significant difference between work-life balance of government and private hospital nurses. The results of the study reveals the impact of work-life balance of government and private hospital nurses towards self-care, health problems, job satisfaction and organizational commitment.
- Mahesh, B. P., Prabhushankar, M. R., Chirag, S. K., & Amit, V. S. (2016). A study of work-life balance and its effects on organizational performance. *International Journal of Engineering Research and Advanced Technology*, 2(01), 344-349, this review study examines and evaluates the literature on work-life balance, including its aspects, implications on performance of the organization, and attempts to establish a work-life balance.

- Raga Sudha Addagabottu, Dr. Nagaraju Battu (2015) in their research paper titled “A Study on the Variables that Influence Work Life Balance of Women Doctors and Nurses with Special Reference to Government and Private Hospitals of Guntur District”, which aims to study the Work and Family/ Life related variables that influence the Work life balance of women Doctors and Nurses with reference to the government and private hospitals of Guntur District. In addition to that this particular study aims to determine the Work and Family/ Life related variables and their impact, the ways and means employed by women to manage and overcome various forms of work and family related conflicts.

WORK LIFE BALANCE AND ITS IMPORTANCE IN PRESENT ERA

- **Work-Life Balance Leads to Less Stress:** Work-life balance refers to changing your daily activities in order to attain a sense of balance between work and personal life. Reduced stress levels at work and at home are some of the advantages of a healthy work-life balance, increased concentration and focus
- **Work-Life Balance Aids Mental Health**
- **Having a sense of balance is linked to better physical health.**
- **Maintaining a healthy work-life balance improves your ability to be present.**
- **Maintaining a healthy work-life balance improves your relationships.**
- **A Healthy Lifestyle Improves Workplace Engagement**
- **Work-Life Balance Improves Creativity**
- **Balance Increases Productivity**
- **Achieving True Balance Leads to Happiness and Fulfillment**
- **Work-Life Balance Leads to Greater Success**

THE IMPACT OF A LACK OF WORK-LIFE BALANCE ON ORGANIZATIONS

Following a review of the literature on the many issues of Perform-Life Balance, its ramifications, and influence on the company overall, it is obvious that a company cannot work to its fullest capacity unless all workers participate and commit, which comes from a healthy work-life balance.

A poor work- life balance can have an impact on personal relationships beyond the work. Employees who have a weak work-life balance are prone to be stressed. Stress can lead to health hypertension, heart disease, high sugar, obese, and depressed. Stress can also weaken one's immunity. These health difficulties will eventually drive employees to call in sick more frequently, reducing productivity. Feeling burned out and highly stressed contributes to a low productivity. Employees who are overly anxious at work are unable to concentrate or find a cause to care. If an individual continues to disregard their family and friends for work, they will develop relationship issues that will generate much more tension in their work life. The bottom line is that dissatisfaction at work can lead to dissatisfaction at home, and conversely.

WORK-LIFE BALANCE AND MEDICAL PROFESSIONALS

A Medical Professional's profession is considered to be hitched to their work. The career of a medical professional requires all of their strength, tolerance, understanding, and attentiveness. Medical Professionals frequently encounter overwhelming and unpleasant experiences due to the nature of their employment. These upsetting events might have a detrimental impact on their overall development unless they actively reflect on them and make the necessary behavioural adjustment. But do Medical Professionals have the time and energy to reflect on their experiences?

Today's medical professionals are battling to restore their personal lives within their work lives. It has also been observed that, in comparison to other occupations, medical professionals are twice as likely to have work-life balance issues. They are under great time and pressure to satisfy the demands of their job commitments as well as personal and family obligations. A Medical Professional's discomfort might be exacerbated by difficulty managing personal and professional life.

The quality of patient treatment is affected by medical professionals' discontent with their profession, hospitals, and work environments. Can hospital administration be apathetic to challenges and problems experienced by its Medical Professionals, given that they anticipate, rather than highlight, that they deliver the best care and service to their patients?

However, hospitals must address to Medical Professionals' WLB difficulties and establish support programmes that assist Medical Professionals to resolve problematic situations and attain complete fulfilment.

Overall, the work-life balance concern for hospital medical professionals is a hot topic that not only affects their personal growth and happiness, but also impacts their degree of satisfaction with their job and profession, affecting their decision to stay or go.

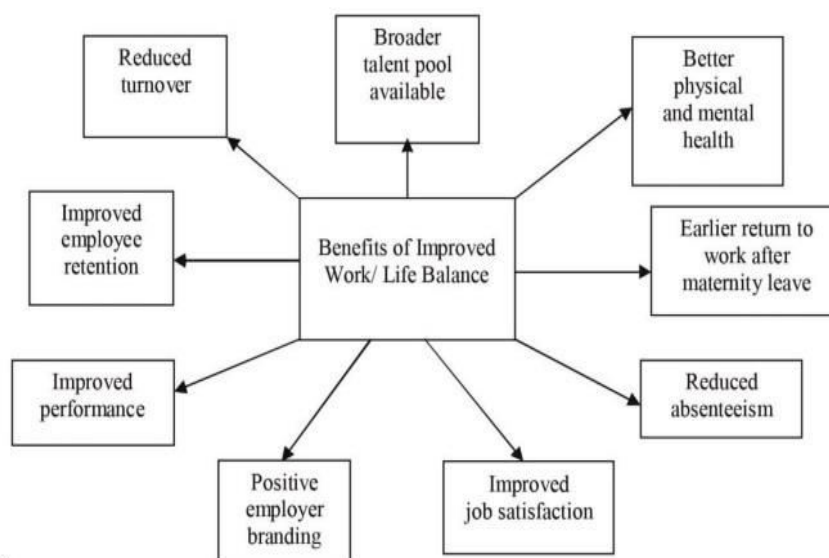
As a result, it has an impact on the safety and quality of healthcare services delivered to patients. Medical professionals must strike a healthy work-life balance in order to appreciate their vocation as a lucrative career without neglecting their personal lives.

ROLE OF EMPLOYEES IN THE HEALTH CARE SECTOR

- Manage sensitive populations' care and care shifts.
- Reduce patients' sense of isolation.
- Decide eligibility and register people in health-care plans.
- Ensure that healthcare practitioners who serve communities are culturally competent.

WORK-LIFE BALANCE: BENEFITS

Work-life balance has proved extremely helpful to both its people and enterprises. The benefits of work-life balance to organisations are summarized in Figure 1.1.



(Source: Hudson, 2005)

Figure 1.1: Benefits of Work-Life Balance

RESEARCH METHODOLOGY

In this study, the exploratory cum descriptive research design was used. Because little was known about medical professionals' work-life balance at the start, the study was exploratory in character. Previous study findings were assessed in order to have a better knowledge of the factors that affect medical professionals' work life. After then, the study shifted to a descriptive mode, with the focus turning to the interrelationships among the numerous factors that affect medical professionals' work-life balance.

Sample Size

The sample size is another consideration in sample selection. According to Malhotra (1999), the sample size for a research is determined by the type of analysis to be used. Analysis approaches such as exploratory factor analysis and regression analysis were used in this study. Researchers have recommended that a sample size of more than 500 is sufficient for these statistical approaches to get satisfactory results (Gorsuch, 1983; Bryant and Yarnold, 1995; Garson, 2008). The current survey gathered answers from 983 female medical practitioners. A significant number of prior researches recommended a 20:1 subject to variable ratio, which this sample size met (Kline, 1979; Gorsuch, 1983; MacCallum et al., 1999).

Sampling Technique

Convenience sampling was used to collect data from female medical professionals in this study.

“Exploratory Factor Analysis”

To assess the dimensionality of the data, a "Exploratory Factor Analysis" (EFA) was done using the most recent version of SPSS, i.e. SPSS 24.0. The techniques of "Principal Component Analysis" (PCA) with "Varimax Rotation and Kaiser Normalization" were used to extract factors.

The factor- Ambition-Attainment Gap, and Career Stability were retrieved. The "Bartlett's Test of Sphericity" (BTS) result was determined to be significant ($\text{sig} < 0.05$). In addition, the Kaiser-Meyer-Olkin (KMO) value (0.979; > 0.6) was acceptable. This result indicated whether the sample was suitable for factor analysis using the EFA (Malhotra and Dash, 2011).

ANALYSIS AND FINDINGS

Findings based on a questionnaire filled out by medical professionals at Bihar's health care centres:

Item Code	Statement	EFA Loading
Ambition-Attainment Gap (Cronbach's Alpha=0.966)		
S1	I feel disappointed about my achievements in life in many ways.	.721
S2	I feel like moving away from my current engagements to what I had aspired for.	.785
S3	I feel my aspirations and my achievements do not match.	.739
S4	I feel my aspirations and my present job do not match.	.569
S5	I feel I have not done enough to achieve my aspirations.	.662
S6	I feel a mismatch between my aspirations and my career path.	.701
Career Stability (Cronbach's Alpha=0.968)		
S7	I feel stuck due to my deteriorating health.	.591
S8	I feel stuck due to my advancing age.	.654
S9	I am disturbed when I think about the shortness of life.	.786
S10	I am disturbed when I think about making a fresh career move.	.821
S11	I am disturbed when I think about the failures I may encounter if I make a fresh career move.	.765
S12	I am disturbed when I think about the reactions of people around me if I make a fresh career move.	.781
Work-Life Balance (Cronbach's Alpha=0.689)		
S13	I have to put off doing things at work because of demands on my time at home.	.771
S14	Things I want to do at work don't get done because of the demands of my family or spouse/partner.	.767
S15	My home life interferes with my responsibilities at work such as getting to work on time, accomplishing daily tasks, and working overtime.	.546
S16	Family-related strain interferes with my ability to perform job-related duties.	.609

Findings Related to the Relationship between Ambition-Attainment Gap and Work-Life Balance

The study finding also shows that there is a significant impact of the Ambition-Attainment Gap on the work-life balance of female medical professionals. This implies that when female medical professionals perceive that they are achieving what they desire from their career, they feel more motivated helping them to strike a good balance between their work and family. On the other hand, the feeling among female medical professionals that they are not able to achieve their career goals may dishearten them that eventually play a negative role in poor balance between their personal and professional lives.

Finding Related to the Relationship between Career Stability and Work-Life Balance

The results of this study indicate that career stability significantly impacts the work-life balance of female medical professionals. This implies that when medical professionals perceive that their career growth stagnates then they face problems in striking a good balance between their professional and personal life. This supports the findings of the previous studies as well wherein the researchers have suggested that the lack of growth in the career affects the motivation of professionals and hence, difficulty in striking a good balance between the professional and personal life.

SUGGESTIONS

- Find the areas wherein work is more demanding and implement good HR practises to prevent stress and strain, such as brief rest intervals in between shifts, improved rest rooms, etc. Employees might have some activities at work on occasion, such as completing puzzles or celebrating birthdays, to feel calmer.
- Yearly family gathering must be held to ensure the happiness of the employees' families. Professionals and their family members might be included in the company's activities of CSR.
- Regular medical examinations and brief rejuvenation sessions for physical and mental wellness might help reduce stress
- Keep an eye on staff stress and mental wellness.-A poor work- life balance can have an impact on personal relationships beyond the work. Employees who have a weak work-life balance are prone to be stressed. Stress can lead to health hypertension , heart disease, high sugar, obese, and depressed. . These health difficulties will eventually drive employees to call in sick more frequently, reducing productivity.
- Use flextime to achieve work-life balance goals-Flexible work hours are one technique to assist employees in achieving the necessary balance between their personal and professional lives. Flexible scheduling allows employees to collaborate with you in selecting the best way for them to work most successfully.
- To achieve a decent work-life balance, encourage healthy communication-Work may be taxing, and many people may be inclined to carry work home with them, putting their relationships under stress. Encourage employees to be honest and transparent with you as to whether or not they think they can handle another assignment, and make it clear that their candour will not jeopardise their employment or career prospects. Work and home life will suffer if they are overworked. Acknowledge them for being forthright and honest, as well as for communicating appropriate limits.

CONCLUSION

It is critical that healthcare organisations recognise the impact that globalization has on the way business is conducted and that they modify their processes to meet the difficulties faced of global change. The key to this is good human resource management, which includes developing employees through engaging and interactive training and development programmes, as well as rewarding additional work and time through creative programs and workforce outreach programs. Work-life balance is inextricably linked to work attitude. Even if we overlook the organisational benefits of a healthy work-life balance, we cannot deny the fact that conflict between work and home life invariably tends to result in a stressed and depressed employee who is less productive. Organizations should make numerous resources accessible, such as improved lavatories and flexible work hours, because they have been connected to organizational commitment and job satisfaction for all workers with family commitments. Organizations should engage and develop in order to build procedures that make employees feel engaged and important organizational members.

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Changing Scenario of Digital Currency in India: “A Study after Globalization”

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ABSTRACT

The Modi government's demonetization of money in 2016 altered India's push towards digital payment options. Though it was a difficult decision for a country like India, where 90% of transactions are made in cash, people quickly adopted digital payment methods. The proliferation of smart phones and the availability of user-friendly payment options such as PAYTM and BHIM UPI have aided the adoption of digital payment systems. Although digital currency is not illegal, it is unregulated. It requires proper administration in order to be reliable for banking activities as well. This study shows that due to the governments other actions, such as imposing new laws or driving businessmen to leave the country in search of profitable business, I am looking for profitable business. People's fear of losing their money is encouraging them to utilise digital currency, which makes transactions more safe and quick. Digital currencies have their own set of limitations. The goal of this research is to figure out how a ban on digital money will affect the economy and what the implications will be.

Keywords: Demonetization, Digital Currency, User-Friendly, Digital Payment

1.1 INTRODUCTION

The term 'digital currency' alludes to cash that is just accessible in electronic or digital structure. Digital money, digital cash, electronic cash, and electronic currency are terms used to depict it. Digital currency exchanges are completed by means of electronic wallets or PCs associated with the web or explicit organizations. Digital monetary forms, generally speaking, don't need the utilization of middle people and are many times the most financially savvy method for moving monetary forms. Digital monetary forms are not all cryptographic forms of money, and digital currencies are not all digital monetary standards. Digital monetary standards accommodate frictionless worth exchange and lower exchange costs.

1.1.1 Central Bank Digital Currency

A Central Bank Digital Currency (CBDC) is a digital variant of the national bank's legitimate delicate. It has a similar worth as government issued currency and might be traded one for one, however in an alternate configuration. The national bank's monetary record will show a sovereign currency in electronic structure as an obligation (currency available for use). CBDCs ought to have the option to be traded for cash. National banks all through the world are pushing digital monetary standards for an assortment of reasons, including expanding the utilization of electronic cash and forestalling the development of private digital resources like cryptographic forms of money. As per an overview led by the Bank for International Settlements (BIS) in 2021, 86 percent of national banks were effectively examining CBDCs, 60% were trying different things with the innovation, and 14 percent were running experimental runs programs. More than 91 nations, representing more than 90% of worldwide GDP, are fostering their own concentrated digital currency. India's digital currency is still in the beginning phases of improvement.

Except for being a sovereign-upheld office, India's own authority digital currency is wanted to make a big appearance in mid 2023. It will be like any of the generally accessible privately owned business worked electronic wallets. Pastor of Finance and Corporate Affairs Nirmala Sitharaman expressed in her spending plan discourse for 2022-23 that a national bank-supported 'digital rupee' would be sent soon. The Reserve Bank of India has made its proposition to embrace digital currency in stages open. The discount part of the CBDC has gained incredible headway, as per Mr. T. Rabi Sankar, Deputy Governor of the Reserve Bank of India, while the retail part would take more time. The digital rupee will be based on blockchain innovation, bringing down currency upkeep costs and permitting the public authority to deliver less notes. Since digital structures can't be annihilated or lost, the currency's life expectancy will be expanded.

1.1.2 The Importance of Digital Currency

CBDCs are a more secure sort of digital cash since they are immediate liabilities of the national bank, like paper cash. This is tantamount to a circumstance wherein everybody has a national bank financial records.

End of paper cash: Since a CBDC unit is an immediate national bank commitment that is definitively comparable to paper cash as opposed to only convertible into it, there will be compelling reason need to change over paper cash into digital cash, and there will be compelling reason need to change over paper cash into digital cash. Individuals will have less opportunities for putting away money and different assets since they will never again require cash outlets.

Easier implementation and regulation of policies: All transactions in a CBDC environment can theoretically be tracked using data analytics and artificial intelligence to swiftly identify banks that are failing or participating in suspicious operations. In a CBDC world where digital bank codes are accessible to the clearing institution, it becomes much easier for authorities to identify the parties to a transaction, which greatly simplifies the discovery of criminal activity and eliminates black markets that deal primarily in real money.

CBDC transactions do not require a bank account, which is important in poor nations where a third of the population does not have access to traditional money but does have mobile internet connection. An unbanked Indian customer can effortlessly transact using a mobile app if they have an Aadhar number and a smartphone. This means that governments around the developed world will soon integrate those who were previously barred from the financial system.

Currency management costs: As per market gauges, every Rs 100 (US\$ 1.33) note will cost 15-17 percent on each delicate of Rs 15-17 (US\$ 0.2-0.23) all through its four-year life cycle. The cycle includes the printing of new notes and the arrival of messy notes to the RBI through business banks. Considering that bigger division notes are being deliberately eliminated as people relocate to digital rupee rather than paper-based currency, the expense reserve funds from a digital currency may be huge.

Defeating worldwide contrasts: CBDCs could help with the globalization of installment frameworks by making them all the more constant and savvy. Without the utilization of a go between, an Indian purchaser can pay an American exporter in digital dollars continuously. This exchange would be finished, very much like giving over cash in dollars, and it wouldn't require the utilization of the US Federal Reserve framework for repayment. Time region varieties would never again impact currency settlements.

1.2 SIGNIFICANCE OF THE STUDY

- It has the potential to make financial transactions more efficient and precise.
- It allows funds to be transferred directly between two parties without the involvement of a third party like as a bank.
- It enables us to store funds in one or two types of wallets, each of which can be readily converted into our accounts.
- There are no fees associated with utilising the wallets to hold digital currencies.

1.3 REVIEW OF LITERATURE

According to Fan Yifei (2018), the PBOC's future digital currency will utilize a two-level working framework. The PBOC utilizes the instrument of trading digital currency with banks or other qualified functional associations, who thusly trade it with everybody. The significant explanation is that the two-level model doesn't modify the currency's debt holder bank relationship, not the current cash supply framework or the double design account. It won't prompt "monetary disintermediation" in light of the fact that the two-level model doesn't rival business banks' store cash, doesn't increment dependence on the interbank market, and doesn't impact business banks' ability to loan.

Mu Changchun (2019) accepts that the two-level digital currency framework is suitable for our nation's conditions. It can possibly provoke the curiosity of business banks while likewise working on the smooth acknowledgment of digital currency. The debt holder leaser relationship of currency available for use won't be impacted by the two-level working design. Business establishments completely pay hold monies to the PBOC to guarantee that the PBOC's digital currency isn't overissued. PBOC's digital currency is as yet its own commitment, upheld by the bank's acknowledge and for endless legitimate delicate.

According to Yi Gang (2020), the digital economy is turning into a more fundamental driver of worldwide financial development. Lawful delicate examination and application will help fulfill public needs in the digital economy, increment the comfort, security, and hostile to falsifying level of retail installment, and eventually advance China's digital economy improvement.

Electronic installment is addressed by SWIFT, Alipay, WeChat, and Apple Pay, digital currency is addressed by Bitcoin and Litecoin, which depend on blockchain innovation, stablecoin is addressed by Libra, and national bank digital cash is as of now being investigated. Bitcoin, as indicated by Arvind Narayanan and Joseph Bonneau (2016), is actually significant, unique, interesting, and established on sound hypothesis. They are sure that Bitcoin has areas of strength for a to other PC sciences, and that its innovation can uproot laid out organizations. Blockchain innovation, as per Yao Qian (2020), is a believed digital innovation whose worth is plainly obvious. It's anything but a misrepresentation to call it the digital time's foundation.

Zhao xijun (2020) feels that Alipay and WeChat, which depend on charge card installment, are as yet paying in RMB in nature. The PBOC is effectively fostering a digital currency that depends on Bitcoin's blockchain innovation and is basically a digital cash. The blockchain is an encoded data transmission that is completely founded on web encryption innovation. It's simply that the information is given a money related worth and importance.

1.4 RESEARCH GAP

By settling on a digital currency as a resolution to innovation and creativity, the Indian economy has reached a sweet spot of growth. Despite many bans on digital currencies, authorities may point to a number of examples that demonstrate the potential for leveraging and using it as a secure way of transaction with a positive influence on the Indian economy.

1.5 METHODOLOGY ADOPTED

- 1) To tackle the research problem, a descriptive study is conducted.
- 2) Collecting secondary data
- 3) Qualitative research approach

1.6 DISCUSSION

1.6.1 Digital Currency in India

The impact of Digital currency on the Indian economy is plainly apparent, since the Digital currency market's costs are presently diving. The Indian government has made it plain that bitcoin doesn't have legitimate remaining in the country. The public authority's choice stems from various variables, the first is the trouble of observing decentralized exchanges in Digital currency, which may be ideal for programmers, crooks, and psychological oppressors. The subsequent explanation is that the bitcoin market might represent a huge danger to the financial administrations business.

Digital currency, for example, Bitcoin have filled in notoriety in India and different nations, with the volume of Indian rupees exchanged Digital currency at a record-breaking high since demonetisation. As per research, the rupee-overwhelmed Digital currency produces the third most prominent volume exchanged behind the US dollar and the yen. The demonetization regulation of 2016 may have helped the reception of Digital currency by a huge piece of people in general, yet realities immediately arose that eased back the market's development in the country. In spite of its huge populace, India represents scarcely 2% of the overall bitcoin market capitalisation. In the Indian setting, Digital currency has a couple of downsides.

1.7 PRESENT AND FUTURE OF DIGITAL CURRENCY IN INDIA

Currently, there is no Digital currency regulation in India. Due to the lack of regulation, certain bitcoin exchanges, such as Unocoin, Zebpay, and others, have begun trading Digital currencies with Know Your Customer (KYC) requirements. The Reserve Bank of India was previously opposed to Digital currency trade in India, but in 2014, the RBI expressed interest in block chain technology, which is utilised by Digital currency to limit the circulation of actual paper currency. The Reserve Bank of India (RBI) produced a financial stability study in 2015 that highlighted the relevance of private blockchain. In 2016, ICICI Bank and Emirates NBD (one of the Middle East's major banking companies in terms of assets) used block chain technology to complete transactions and remittances. In 2017, the RBI's Institute for Development and Research in Banking Technology (IDRBT) published a white paper and conducted a pilot test.

"The government does not consider Digital currencies legal cash or coin," the Union finance minister stated in his Union Budget 2018 speech, "and will take all efforts to eliminate usage of these crypto-assets in financing illicit activities or as part of the payment system." The government, on the other hand, has acknowledged blockchain, stating that it is a "distributed ledger system or blockchain technology that allows organisation of any chain of data or transactions without the use of middlemen." The government will proactively investigate the application of blockchain technology to usher in the digital economy." Though the government is wary of Digital currencies, it is enthusiastic about the application of blockchain technology. Blockchain and Digital currency, according to the Digital currency industry, must go hand in hand. However, it is as good as keeping track until and unless a decentralised system is established. If only block chain technology is used, it creates a centralised system that allows a person or a group of people to correct and alter it.

India's experts and watchers hope and forecast that the government would regulate Digital currencies in India in stages. These encouraging signals offer the Digital currency industry reason to be optimistic. Meanwhile, private companies dealing in Digital currencies have formed the Digital Assets and Blockchain Foundation,

which has been educating the public on the benefits and investment opportunities in Digital currency through security checks, government-issued identification documents, and Permanent Account Numbers (PAN) or Aadhaar IDs.

Digital currency has enormous development potential, similar to that of the internet. There is a possibility of virtual banks in India in the future, thanks to both these components of the internet and blockchain technology. As a result, the Reserve Bank of India has begun steps to develop its own Digital currency, dubbed 'Lakshmi,' to demonstrate its worth.

1.8 POSITIVE IMPACTS OF DIGITAL CURRENCY

- There is no requirement for a middleman. These currencies can solve the challenge of social trust, and by increasing their access, they can help emerging countries accelerate their growth processes.
- Unlike traditional payment systems such as debit and credit cards, Digital currency have no transaction fees because transactions are processed through the Digital currency public network, which uses Blockchain technology.
- The processing of credit or debit cards can take up to three days. Transactions in Digital currency take 10 minutes to clear. This demonstrates that in the case of Digital currency, transaction speeds are extremely fast

1.9 NEGATIVE IMPACTS OF DIGITAL CURRENCY

- The price of Digital currencies can fluctuate dramatically in a short period of time, making trading with them challenging for market participants.
- While the details of Digital currency users are stored in a public ledger, there may be a problem when it comes to customer identification or fraud protection. This demonstrates the system's lack of anonymity.
- Because many businesspeople are uninformed of how to defend this new type of digital cash, Digital currencies work digitally and evidence of ownership is restricted to private keys. As a result, they have become a prime target for hackers.
- Digital currencies are thought to be harmful to the environment. To authenticate transactions, this digital money employs blockchain technology, which necessitates the use of computers all over the world to solve difficult equations. This is known as data mining, and it may be quite profitable. As an incentive, the person who is involved receives bitcoin. This computation technique uses a significant quantity of electricity.

1.10 CONCLUSION

Digital currency is an example of an invention that has become a worldwide phenomenon. The Reserve Bank of India had previously warned Indians against using digital currency, which has been linked to money laundering and terrorism financing. Digital currency, on the other hand, is a cutting-edge technology and a tool that should be anticipated. Despite the Indian government's lack of legislative response, the number of investors in digital currency has been rapidly expanding in recent years. Because the use of such currency in India is quickly increasing, the Indian government should take prudent actions immediately to control it. The future of digital currency in India appears bright, and there is reason to be optimistic.

According to the findings of this study, digital currency is catching the new technology wave, and its growing relevance is paving the way for the approaching era of digital revolution. Despite the fact that this digital currency carries a lot of hazards, it has attracted billions of dollars in investment because to its permanent transparency, traceability, low transaction costs, lack of processing fees, and high profile earnings. A blanket ban is one thing; but, if they prohibit the use of digital currency, it will put investors in jeopardy. Many exchanges have managed to stay afloat by engaging in peer-to-peer and crypto-to-crypto trading without the use of an intermediary. These exchanges will be shut down as a result of the prohibition. A large number of work prospects will be lost. The Indian government should take steps to regulate digital currencies, which are the future of profitable business and economic productivity.

1.11 RECOMMENDATIONS

India must move away from old payment systems and become one of the most active participants in the approaching IT-based era. It is not the best option to prohibit such currency because it will demotivate start-up businesses. What is vital is that effective regulation with secure KYC criteria be implemented. All that is required is for policymaking to be done correctly. This type of digital transformation will provide new job opportunities at all levels, from IT developers to marketers, lowering unemployment and, in the long run, helping to revive the economy's poverty rate.

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Color Identification Using AI

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ABSTRACT

Man sees the world in colors. When it comes to the visual aspect, it is only meant to be pleasing to the eye, but when its structure is questioned, it becomes a challenge. It is very easy to serve the values without the hard work of finding one who understands colors. This paper suggests the idea of teaching a computer that detecting and defining color is sufficient for useful applications. The proposed detection algorithm uses the gain of the camera and feeds in the data to detect color based on RGB values. The algorithm calls a function that loops over adjusting the distance based on the closest match. It helps to easily define colors with extreme accuracy based on the RGB color space.

1 INTRODUCTION

Color is one of the most important features of an image. The process of color detection is the process of detecting the name of any color. This is a basic step in many computer vision systems and is essential for recognizing objects. It is also used as a tool in various image editing and drawing apps. When using OpenCV, color recognition has several advantages, for example, it allows detecting a specific color in live streamed video content. Color is a feature that has been widely exploited in digital image processing, as it is a powerful tool that often facilitates the classification and identification of objects, including a large number of admirable color tones. Can be discriminated against.

Most detection techniques are based on artificial intelligence. AI refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term can also be applied to any machine that represents traits associated with the human mind, such as learning and problem solving. The ideal feature of artificial intelligence is the ability to rationalize and perform actions that have the best chance of achieving a particular goal.

Speaking of computer vision, it is a multidisciplinary scientific department that works on digital images or videos to automate tasks that can be performed through the human visual system. Computer vision is an interdisciplinary scientific field that deals with how computers can gain a higher level of understanding from digital images or videos.

From an engineering point of view, it seeks to understand and automate the tasks that the human visual system can perform. Computer vision tasks include gathering, processing, and analyzing information from digital images. Computer Vision is a field of artificial intelligence that trains computers to interpret and understand the visual world. Using digital images from cameras and video and deep learning models, machines can accurately identify and classify objects.

Thus, Idea has been created as an application through which anyone can get the name of the color by clicking on it automatically. With a data file containing the color name and its values, the distance from each color is calculated to find the minimum.

2. LITERATURE REVIEW

1. Region Segmentation Coding of Color Images Based on the Uniform HEVC Color Space Makoto Mehara Et Al (1993)

This paper integrates region segmentation based on the corresponding color space and region integration based on the color difference between regions. Then a new region segmentation coding is proposed based on the result of the segmentation of the said region. It is believed that an object with a color icon corresponds to an area of approximately the same color. Within the region, color information is largely based on memory colors, and shape information is encoded using chain codes.

For price information that includes object size, shadow, etc., adaptive cosine transformation coding is applied. For Chrome information, the area is estimated by a multiplicative function and its coefficients are encoded. The proposed coding method is applicable to many standard images which are relatively simple structure images with different face shapes.

Color information is transmitted with relatively high efficiency, accounting for about a quarter of all transmitted information. And the usefulness of the proposed division of territory is demonstrated in this

article. Compared to traditional viewform coding, the method has the advantage that the local manipulation of the image is easy, although the total transmitted information is slightly larger.

2. Interactive Segmentation of Color Images Based on Color Silence Hironori Takimoto Et Al (2015)

In this article, we give tips on how to create a new interactive preview based on color prominence. In our method, the user provides only a few preview pixels as an initial reference. Preview and background probabilities are described using a Gaussian composite model and a color saliency map based on the provided reference pixels, to extract multiple target objects. These possibilities are included in the cost of the proposed graph. Finally, the image is distributed by refining the proposed graph using the graph cut algorithm.

3. Distribution of Color Images Based On SLIC and Watershed Algorithm Hou Zhiqiang Et Al (2019)

In this article, in order to overcome the problem of over-segmentation caused by traditional watershed algorithms, simple linear iterative clustering (SLIC) and color image segmentation algorithms based on watershed algorithms are proposed to achieve an ideal segmentation effect. First, the algorithm calculates the number of pre-separated super pixels in terms of image complexity, and SLICs to pre-process the super pixel segmentation of the original image to reduce unnecessary information in post-processing. Then, an adaptive threshold calculation method is proposed to process the successive image of the pre-formed image to effectively eliminate the noise and obtain more complete contour information. Finally, the watershed segmentation algorithm is used to segment the image drawn with the minimum value marker. Experiments on a large number of images have shown that the proposed algorithm can effectively suppress the problem of over-segmentation caused by traditional watershed algorithms, and is better than traditional algorithms compared to LCE and GCE, and in segmentation quality. Have improved.

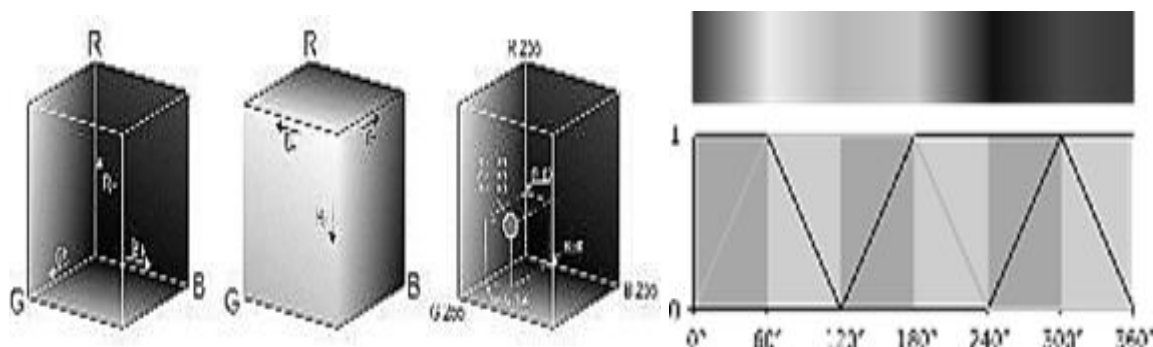
4. Automatic Distribution of Color Images with Temporary Shutdown M. Ozan Et Al (2014)

This article introduces a mask-based automatic segmentation algorithm for color images that use pixel matching. The basic concept of the algorithm relies on Warshall's Transit Closure (TC) calculation algorithm for local masks and area integration for course segmentation. Although the proposed local mask approach reduces the computational load required for segmentation or clustering techniques, such as seeded region growing (SRG) or fuzzy semen (FCM) that require user-supplied parameters, it has a higher segmentation error. it occurs. Therefore, the transit closure algorithm, which uses adjacency and matching matrices connected to a non-directed graph of a more segmented image, has been used to merge regions. After comparison with current methods, the obtained experimental results confirmed that color images as well as gray level images could be delivered with great accuracy. Also, the computational complexity of image segmentation has been significantly reduced. In addition, a user-supplied parameter is not required, such as the number of clusters or badge points.

3. METHODOLOGY

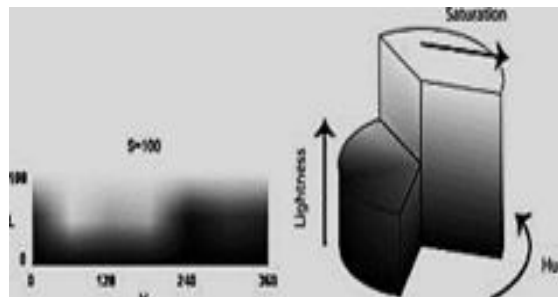
A. Rgb Color Space

An image is basically a matrix of pixel values. The image can be represented using several color models such as gray scale, RGB, HSV, etc. The RGB model is used to detect colors in an image [6]. The RGB color space is included in an additional color model that combines red, green, and blue light in a variety of ways to recreate a wider range of colors. RGB is commonly used in color detection, as the image data captured by the camera is usually rendered and stored as RGB. For example, Yang et al created two code boxes for visual tracking using RGB features and local binary pattern features.



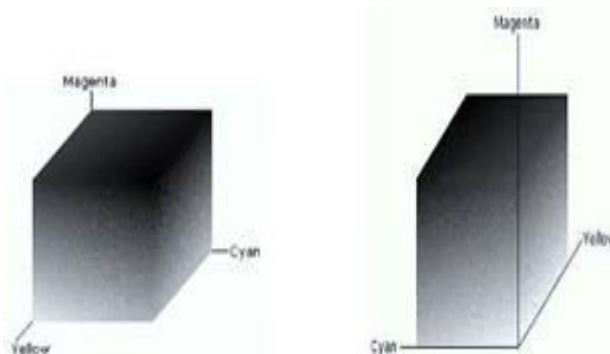
B. HSL Color Space

In the HSL color space, H, S and L represent three different dimensions, respectively, and each dimension has two limit values (maximum and minimum values). 'H' is color meaning color name, such as yellow, red, and range is from 0° to 360°, 'S' is saturation meaning color purity, range 0 to 100, 'L' is lightness and Represents the range is 0, 100. There is less of a basic color definition in HSL regarding their intensity and weight.



C. Cmyk Color Space

The CMY color space uses cyan, magenta and yellow (CMY) as its primary colors. The CMYK color space is a variation of the CMY model. These include black (cyan, magenta, yellow, and black (key)). CMYK color space bridges the gap between theory and practice. In principle, no additional black component is needed. However, experiments with different types of ink and paper have shown that when similar components of cyan, magenta and yellow inks are mixed, the result is usually dark brown, not black. Adding black ink to the mixture solves this problem. Compared to the additional RGB color space, the CMYK color space is degenerate in nature.

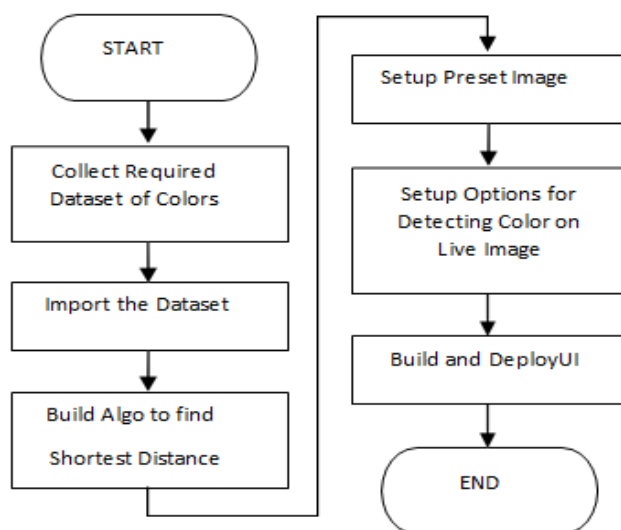


After much deliberation, it becomes clear from above that the discovery of colors is not limited to the human eye, and that there are many divisions and techniques in the mechanical interpretation of colors. Now the algorithm is not difficult to teach, the implementation follows a data file that contains the color and its RGB values, the distance from each color is calculated to know the minimum, it rearranges each iteration Gives. Therefore, the process is as follows, collecting the dataset and then clearing and importing it. The real magic here is in creating the shortest distance algorithm. In the given side code, the functions and keys are in bold and italics, the math calculations are highlighted in italics inside the quotes and the variables are in bold.

1. Create a function to calculate the minimum distance from all colors and get the most matching colors
2. Set the minimum value according to the distance.
3. When the file contains values:
 - a. Set the distance as "the set of absolute values of the difference between image and file values".
 - b. Reset the minimum value.
 - c. Get the color name according to the new minimum.
4. Map the "accuracy" based on the value in the file and the value in the image
5. Plot distance loops
6. Return the name of the last nearest precious color.

This color detection algorithm has developed an application that allows you to automatically find the names of colors by clicking on them. The advantage of the above model is that the distances are calculated by updating the minimum distances one after the other.

Process Flow Diagram



3.1 COMPUTER VISION TECHNOLOGY

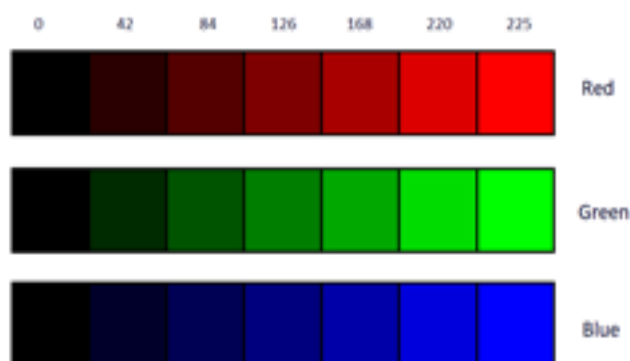
We've all been "artists" at some point in our lives and have created and designed colorful packages to give it a beautiful texture. Distinguish between what we see through the human conception of color. Let's look at examples of different colors on a palette. We've experimented with a wide range of colors, depending on what we use to give them a darker, lighter or different shade of color.

Similarly, AI reads these colors with values from 0 to 255. The image below reminds us of how we used this combination to remember the six dominant colors. This is called the RGB model. Here, red, green and blue are the dominant colors, which together give another combination of colors - magenta, cyan and yellow. Below is a representative picture of

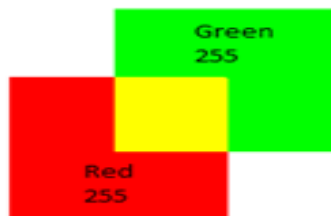


what we went through. We are introduced to visual perception which tells us that white is a combination of many colors. Similarly, our physics experience on parasites gives us similar information on how white light is distributed in different colors.

Traversing from 0 to 55



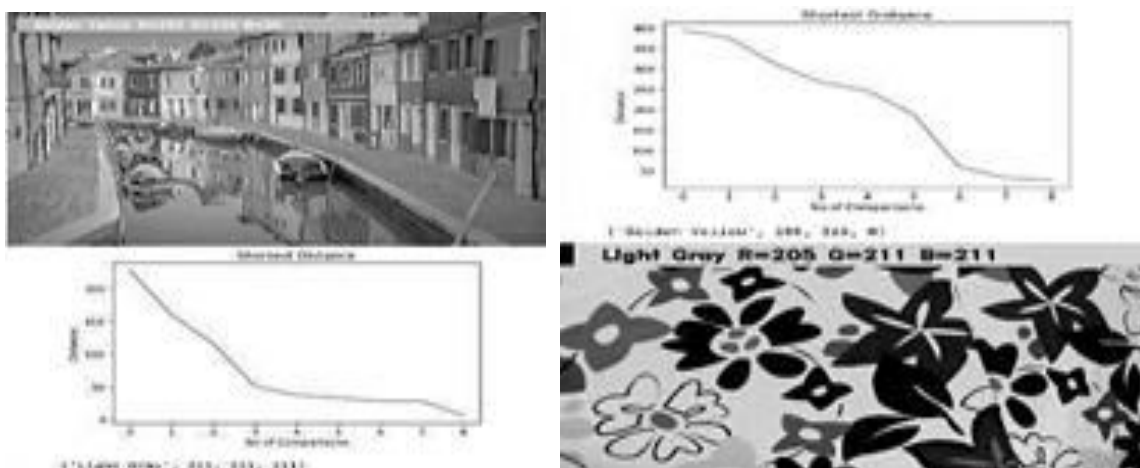
In the image above, each value of red, green, and blue represents a particular shade of color. AI uses these numbers to read and process the image. When we combine two colors, such as red and green, the result is yellow. It is shown as 255,255,0 (R, G, B) in three dimensional space. With the combination of RGB in the .gif above, we can see different colors like cyan, magenta and yellow. This is a technique used to give pixels a special color in computer vision.



An image is made up of adjacent pixels. These color pixels are made up of three channels placed one behind the other. All the channels are combined to give a specific color and these pixels together make up a picture. Let's see how the AI reads the image. By applying the RGB model, we can extract the hues of 16 million (16,777,216, to be exact) colors. Let's look at a set of RGB that makes up the individual pixels.

4. RESULTS

The RGB color model provides accuracy, which ensures that other color models also have a hand of accuracy. Further research has revealed clear differences in color models, which are discussed below.

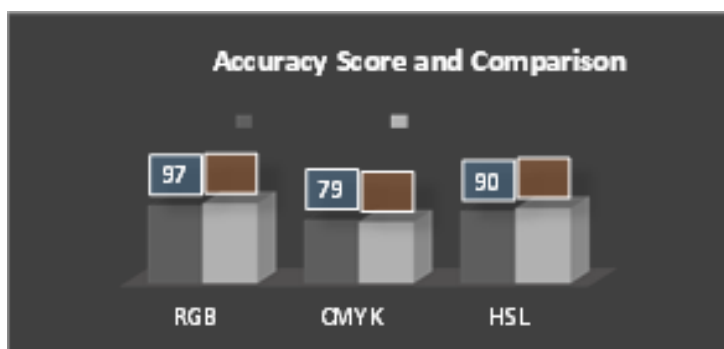


Model	Parameters	Advantages	Disadvantages
RGB	Red, Green, Blue	(1) No transformations are required in displaying information on the screen. (2) Additive property. (3) Proves to be a computationally practical system. (4) Ease in AI applications.	(1) Useless for objects specification. (2) Difficult to determine specific color in RGB model. (3) RGB reflects the use of CRTs.
CMY(K)	Cyan, Magenta, yellow, and Black	(1) Commonly used for production of printed color.	(1) Since it is a subtractive model, the components are pigments or inks, not colors.
HSL/ HSI	Hue, Saturation, Lightness/ Hue, Saturation, Intensity	(1) Preferable for users view since the components are correlated better with human perception of color. (2) The chrominance components (H and S) are associated with the way humans perceive.	(1) Undefined achromatic hue points are sensitive to value deviations of RGB and instability of hue, due to the angular nature. (2) Does not supply with insight for color manipulation. (3) Not uniform.

The above figure gives a complete comparison of why the HD image in this case gives better results than the image taken by a dependent hardware, webcam. What the human eye calls white, in the picture it turns light brown. Graphs show closures in distances after continuous updates to adjust the value of the

minimum distance in each loop. Talking more about accuracy, in the case of RGB distance calculation algorithms, accuracy can be improved by changing the updated distance. An additional advantage of the RGB model is the classification on all color neutrality, which makes it easier to calculate the repetitive distance more accurately than the parallel color model. While RGB offers some controversial disadvantages and questionable benefits, if the problem itself is complex, it may not be appropriate to fit it into a computer-aided system. Everyone works on how color is viewed by computers and given the fact that today's world is full of the data they need, they have not overlooked any color model. We can only rely on the accuracy of the actual color / data seen by the human eye as the barriers to computer vision are in the pixel quality of this hardware. A comparison between them is given below.

This should give a clear idea of why what is done in this article is done. The chart below gives a comparison of accuracy and precision to give a comprehensive understanding. The green bar is for accuracy, and the blue bar is for accuracy. In the case of RGB, accuracy peaks at 97, while CMYK offers 79 and HSL 90. The accuracy is 99, 76 and 93 respectively.

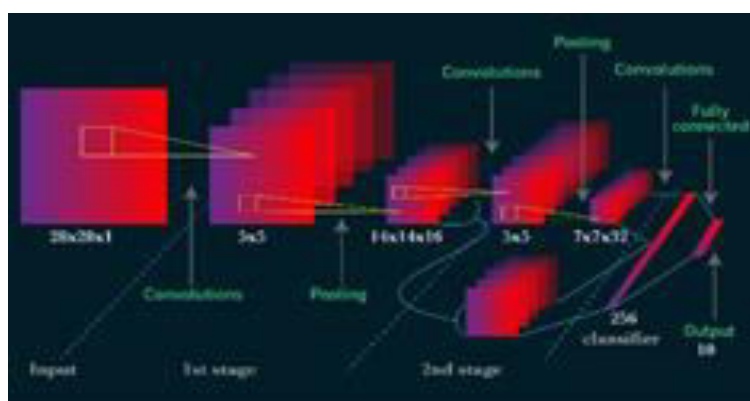


4.1 COMPUTER VISION TECHNOLOGY RESULT

Image ID with Conv Net

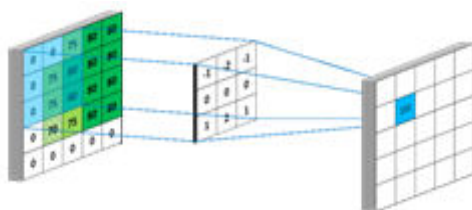
Now AI reads each pixel of the image extracts the RGB value and saves it in memory. It starts searching for similar images in the database to find matches. But how does it work? What is the theory behind comparing different images? Let's consider this.

In machine learning, ConvNet is a complex feed forward neural network. ConvNets are used for image classification and recognition due to its high accuracy. It was proposed by computer scientist Jan Lacon in the late 90s, when he was inspired by the human visual perception of recognizing things. ConvNet follows a classification model that works on creating a network, such as a funnel, and finally provides a fully connected layer where all neurons are interconnected and the output is processed.



During ConvNet training, as the images are being trained, the hidden layer is where the image breaks. This is called convolution. Each image consists of $n \times m$ pixels with a specific depth (3 in RGB and 1 in gray scale). In a ConvNet, these images are split into two processes, namely filtering and polling, and collating into a smaller image. Filtering is a process in which a step of the weight matrix is passed through several iterations in the image to obtain the initial weights as well as the dot product of the pixel values. This is followed by a polling layer that reduces the size of an image to a low-dimensional matrix, which also highlights a single pixel that provides the most information about the image. Let's take a look at .gif which gives us a visual understanding of the process.

Formation of Array



Once we have a complex layer, we can create a fully connected layer to form an array. This information can be compared with the images to determine the likelihood or probability of this part being included in the image. With the 50% threshold, we can start to predict what the image will look like. One of the most commonly used activation functions in this process is the softmax function. We can change the parameters and make the network with more repetitions and more numbers to get better results. It depends on the computational power of your system.

CONCLUSION

Color detection using computer vision was successful. The GUI is able to give users an option so that when the image is double-clicked on a specific color, the correct RGB values are returned. RGB distance error accuracy reaches 97% by using RGB value mapping algorithm to find the shortest distance between the three. Finding colors in real life is a difficult task. But much remains to be done. In a fast-paced and impatient world with changes in technology, we may be looking forward to heights that now seem unattainable. For example, fashion designers or graphic designers are interested in finding and using specific colors that they cannot name or find. The future scope of this project ranges from embedding AI to be able to classify whether detected colors are fully formalized or to capture the parameters of a tool that excludes this aspect of accuracy that can be associated with any. Because, any program must be for promotion.

Although ConvNet may take time to build, the results are fascinating and worthwhile. Therefore, it is not surprising that this method is the most popular in AI, as the results are much better than those of other computer vision techniques like OpenCV. Apart from RGB, other color models like HSI and CMYK also give good results.

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Automatic Door Lock System by Face Recognition

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ABSTRACT

In this paper we have proposed face recognition door lock system for security purpose. Implementation of the system is for monitoring whether any unknown person is entering in to the door. We have established communication with electronic devices through face detection with the help of Pi camera Raspberry Pi platform. For software coding Python and Open CV libraries are used. In order to get accurate and clear picture of an intruder we have proposed Haar classifier method for face detection. As soon as the person enters near the door, pi camera captures the image and face detection process is done then if it matches with database images then the door is unlocked otherwise a message with the picture of a person will be sent to the registered mobile through GSM and LAN network.

1. INTRODUCTION

Nowadays, as the technology is increasing, facilities for human beings are increasing. In day to day activities, life of people has become very easier with the incorporation of many technologies. On the other hand, it also creates security issues [1]. The traditional door locks have a problem that almost anyone can break and enter into your house. Hence it is a great challenge to overcome these problems. In general, in order to secure home, people make use of CCTV. Images will store in the database, so that the action can be taken when any suspicious incident happens. This type of approach is a passive [2]. But there is a need for an active approach. This type of approach is nothing but where actions can be taken immediately as soon as a security threat occurs [1].

Hence a smart IOT based face recognition system is the idea to develop, which recognizes the face of the person near by the door and compares with the uploaded faces stored in the database [3]. If person is detected then the door would open and welcomes them. If an unknown person enters, the owner would be alerted by message and mail with an intruder image. To develop this system, we have used Raspberry Pi, Pi camera which will be installed near the door for recognition of face of an intruder, DC motor to open the door through relay, LED's to indicate whether the door is opened or not, GSM module is used in order to send messages to the registered mobile number.

2. LITERATURE SURVEY

From decades, for science society using of smart home is not a new term. As there is an advance in technology there is a fast increase in the field of home security automation. The control of smart systems for automatic door lock system is done through Bluetooth, internet etc. Most of the laptops, tablets, mobiles have built-in adapters which in turn reduce the cost of the system, but it controls within the Bluetooth range.

The system which is based on SMS technology have only two components [4] i.e. GSM and micro controller. Here micro controller is acting like bridge between the user, sensors and actuators. The author D Aishwarya et al [5] proposed a method for face detection by using algorithm known as viola-jones and recognition of face is done by the revised Gabor filter and multi key point. Using Neural Networks, Nandini M et al [6] proposed a facial recognition system. For training and to extract the local features like nose, eyes, shoulder and mouth they have used back propagation algorithm.

Using MATLAB PCA (Principal component analysis) is implemented by M Mulla et al [7] for face recognition. By using PCA, Eigen faces are generated by changing the faces in the dataset. Distance of the person is calculated by Euclidean distance method. If the distance is less, then it is a recognized face. After that by using GSM module the system generates an alert message to the owner.

3. PROPOSED SYSTEM ARCHITECTURE

The main aim of the proposed system is to design cost effective, great flexibility by connecting all modules to system database and open source home automation system using python for various home and outdoor environments.

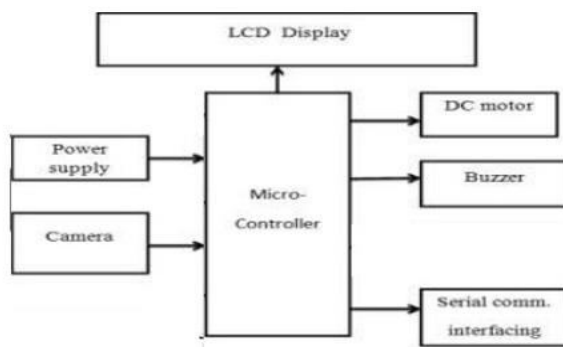
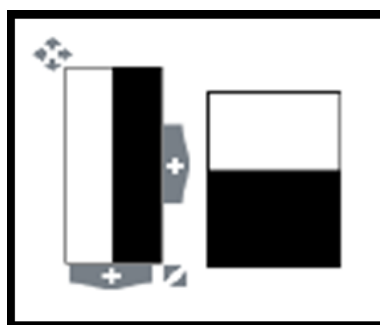
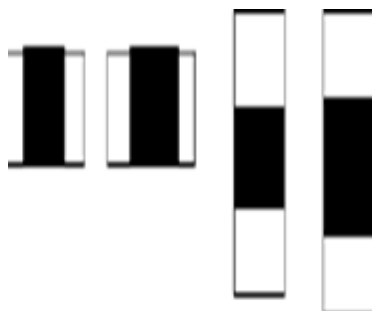


Figure1. Overall block diagram of automatic door access system using face recognition

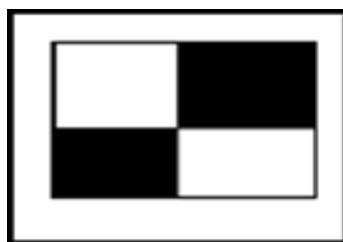
Figure 1 show the block diagram, which contains Raspberry Pi 3, Pi camera, Relay, LED's, and DC motor. This proposed system is connected to the door. As the intruder approaches the door, the Pi camera captures the images. After that the Haar cascade algorithm is used to detect the face which was captured [8]. Firstly this algorithm needs to train whether it is positive or negative images. The faces which are clear are nothing but positive images and without faces are negative images [9]. Haar cascades are the same as convolution kernels which are shown in figure 2. Haar like features are digital image features used in object recognition for real time face detector [10]. The important feature of this is its calculation speed and the other key feature is accuracy. Adaboost machine learning algorithm is used to avoid the complexity of calculations, which is inbuilt in Open CV library [10]. Raspberry Pi processes the captured image coordinates with the existing coordinates in the database. If it matches then it sends the signals to relay switch through GPIO pins. DC motor drives a miniature door which is being used for a door locking system. If the intruder's face doesn't match then the LED's are on and the door remains closed.



1) Edge Feature



2) Line Feature



3) Special Diagonal Line Feature

Figure2: Types of features in Haar Cascade classifier algorithm the main blocks of the proposed system are:

Raspberry Pi

The version of the model (A or B) doesn't really matter. But we have used Raspberry Pi model B with Wi-Fi. With the intention of promoting the teaching of basic computer UK has developed Raspberry Pi as a credit card sized single board. It has a Broad com system on a chip (BCM2835). It also includes an ARM11 700 MHz, video core IV GPU, with originally 256 MB of RAM, now upgraded to 512 MB. It uses SD card for long term storage purpose. It uses a 5V power supply to run [11].

Pi Camera

It comes with a flex cable. This is inserted into the connector located in between the Ethernet and HDMI port. When there is someone next to the door, by using face recognition software it can capture the image and store it in the database using python and then it can be send to the owner through android application, this can help in providing security to home. The camera is capable of 2592 x 1944- pixel static images, and supports 1080p30, 720p60 and 640x480p60/90 video.

Relay

In our system we have used two channel relay for device control. A relay is an electrically operated switch to operate a suitable pull in and a holding current should be passed through its coil. It is designed to operate from 5V to 12V. Relay would be ON, When a LOGIC 1 is written on th e port PIN. It is turned OFF by writing LOGIC 0 on the port pin. The main advantage of this is it very low cost and expandable, and it is noise free system.

DC Motor

A DC motor is rotary electrical equipment which converts electrical energy into mechanical energy. A current running through a coil of wire generates an electromagnetic field aligned with the center of the coil. Changing of the direction and the magnitude of the magnetic field can be done by changing the current flow through it. It is connected to the relay where it drives the miniature door after successful recognition process.

4. PROPOSED METHOD FOR FACE DETECTION

After preprocessing like resizing and cropped images, Haar cascade classifier is used to detect whether there is a single face detected or not. Figure 3 demonstrates the flow chart for the proposed system. Edge, line, and center surround are the features of Haar which are acting as inputs. By these cascade features the test of the image is done. The features of Haar are divided into various different stages [9]. Stage by stage the window will be tested. Usually initial stages will have less Haar-like features. If the first stage window fails, then it is to be discarded and the next stages will not be tested. If all the stages successfully passes then it is considered to be face is detected and checks with the images already stored in database of raspberry Pi [9, 12, 13, and 14]. The advantage of Haar cascade classifiers is fast detection speed compared to other classifiers.

5. EXPERIMENTAL RESULTS

When any motion is detected the Pi camera effectively captures the pictures. The real time face detection is done by cascade classifier. The system starts running once the picture is captured. The figure 4 shows that the face is detected. The shows the received notifications and the captured image on the smart phone. The overall execution time is capturing of images, detecting of faces through cascade classifier and for sending the message with the image of unknown person to the owner.

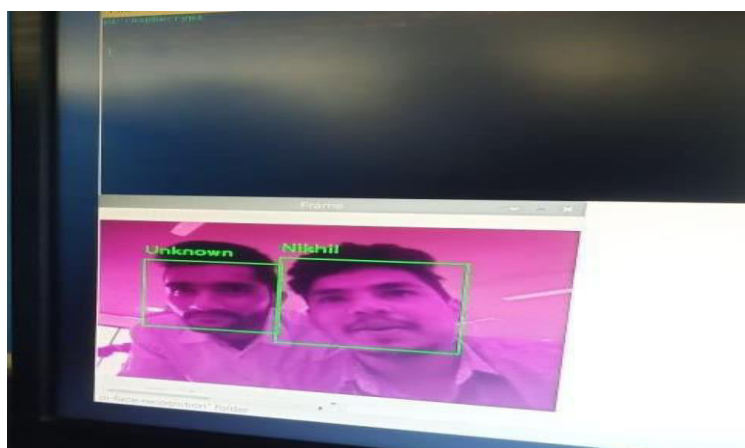


Fig. 4: Face is detected

6. CONCLUSION

In this paper we have implemented a face recognition door lock system. Recognizing of faces is done by using cascade classifiers, which gets a high accuracy and will store in the database. For this testing, we have used 40 images only. Computer vision is used in the IOT. For security purpose, we have implemented real time face detection by Haar classifier. Thus this system can be useful for senior citizens living alone and for immobilized people. Hence the proposed system is practically easy to construct and easy to track the path.

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IoT Based Smart Virtual Physiotherapist

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ABSTRACT

The current epidemic of social isolation, wearing masks, and living at home has taught us to adapt to nature and overcome many challenges in our daily activities. In line with the saying “Problems with Opportunities”, we have come up with a solution for a job that requires intensive medical care ‘Physiotherapy’, our project allows patients to exercise at home and doctors monitor the work, remotely. The model presented has gyro-meters and accelerometers that determine the location of the organ with the help of a microcontroller; data is stored in the cloud. Some of the authors discussed physiotherapy based on visual aids that monitors and corrects the task and... But remote monitoring Authorized Physicians i.e., Physicians in real time is a key feature developed by us in this paper.

Keywords: Physiotherapy, Virtual Physiotherapist, Pandemic, IOT, Cloud.

INTRODUCTION

Physiotherapy, also known as Physical Therapy, is one of the combined health services that, through physical activity, treats acute or chronic pain. Physical therapy is used to improve a patient's physical activity through physical examination, diagnosis, prognosis, and physical intervention. It has been suggested that there is a dose-response link between treatment volume and effective recovery in acute reversal care. To date, only the full duration of treatment has been considered a potential determinant of this dose-response relationship due to organizational challenges and ratings.

Virtual Physiotherapy is a facility, where patients can experience their physical activity and find that they have been approved by their counselors i.e. Physicians. Here, there is no need to visit Physicians physically, patients can exercise, and data collected based on sensory mobility is shared with Physicians where the physician can provide feedback to patients. This IoT-based project is a useful platform to connect devices to the Internet and scan data from anywhere in the world. This project reviews the sensitivity of the site to repair any damage / accident. Caution and control are always needed to avoid any permanent damage to the limb.

In the current epidemic (COVID-19) many patients do not go to their orthopedist for fear of infection, this may result in disagreement or permanent damage to parts of the body. We can solve this problem by replacing the wise physiotherapist with the physiotherapist.

Digital Health Information in India is not readily available; there is a need to build all the infrastructure from scratch, taking into account the status of the people of the Nation. Digital storage is beneficial because of its features such as duplication, synchronization, compression, accessibility, etc. In this paper, we do little to support this; patient data is stored online over the clouds. This will help patients to compile their medical records in the future.

PROBLEM STATEMENT

We are trying to replace or provide alternate solution for actual physiotherapist with smart virtual physiotherapist system as current scenario demands social distancing. As we are going through the pandemic, we came to know lot many other things than the normal day today life things. Most important is to maintain social/physical distancing. Maintaining this we were unable to do many activities which are depending on others like gym trainer, physiotherapist etc. Our ultimate motive is to resolve this issue with the help of this proposed technology.

OBJECTIVE

The main objective of this study was to compare the time and movement steps during actual physical therapy with the time-to-work measurements (i.e. the time the patient was physically active) acquired through a wireless body area network (WBAN) modified 3D accelerometer modules. in Thai and Lower leg.

The secondary objective was to assess the entire activity log from anywhere with the help of IOT and cloud.

- Main objective is to build a virtual physiotherapist i.e. a smart device will be our physiotherapist.
- Provide virtual assessment.
- Sending information to goggle firebase to maintain session activity logs.

- ❑ Monitoring and analyzing patient's health and continuous improvement.
- ❑ An ultimate goal is to develop an IOT enabled Smart Physiotherapist.

RELATED WORK

During the development of human civilization, various health care models were developed, namely: i) a biomedical model, based on diagnostic equipment, focusing on physical or biological processes (i.e., physiological or cellular changes or cellular structure in the human body) without considering the role of social factors. and environmental, or individual perspectives (effective health care services that focus on treatment and minimal prevention are more focused on the medical model [1]); ii) public health decision model [2]; psychosocial bio model [3]; and a complete model [4]. Efforts are being made to integrate the relationship between the various aspects of health care, including demographic, social, environmental, and epidemiologic conditions.

The new approach to health care is of increasing importance especially in western countries, where the burden of care, higher health costs and social care, and the greater impact of co-morbidities are associated with population aging and a growing rate of disability [5]. Health information systems (such as Electronic Health Records (HER), Electronic Medical Records (EMR), electronic instructions and reporting, electronic authorization, evidence-based support, and prevention of disease prevention) promise to contribute to the continuation of health care services, growth . quality and efficiency of health care, which includes services related to knowledge of care, care management, care coordination, and financial responsibility [6].

The importance of addressing the maintenance of functional autonomy for people with moderate to moderate disabilities was emphasized in several care models, where social, technical or environmental factors were considered in health care systems. As the accessibility and efficiency of the health care system is influenced by many factors (i.e., unnecessary testing of health care users; social services for the weak, the disabled. For example, the Canadian PRISMA Integrated Service Delivery System integrates among other features: single entry point; case, individualized, administrative process; a self-assessment tool based on client performance management; better communication tools, within and between health care services [7]. The Cerner Millennium Electronic Health Records program developed by the U.S. Department of Defense for Veterans Affairs, for people with disabilities is an information system where technical challenges and solutions are discussed in scientific literature.

This information system has promoted management development. This information system proposed improvements in veterinary care management by taking into account their social and health care needs [8 - 9]. Examples of health care models that consider the integration of environmental knowledge into comprehensive health care decisions are: The Sustainable Development Service Unit established in 2008, focusing on achieving environmental, social and financial sustainability within the English healthcare system [10]; and the Australian Medical Association's recommendation for environmental sustainability that should include stakeholders such as Australian Environmental Physicians, the Australian Healthcare and Hospital Association, The Royal Australian College of Physicians, and academics [11].

A series of reports and documents distributed by the European Council have suggested: improvements in the quality of life of people with disabilities, which should be based on a rational assessment of their status, strengths and needs; the creation of jobs that create a healthy environment for physical and mental health; the development of support structures around people with disabilities in need of inclusive support; provision of quality health care services to people with disabilities; development of programs and services to meet the needs of people with disabilities [5].

Evidence has shown that five to nine times the savings will be achieved when physical therapy and rehabilitation are given and that rehabilitation is effective in all stages of health conditions [12 - 13]. Interventions, which may be provided with rehabilitation assistance by highly specialized specialists, may yield significant savings (as rehabilitation is very expensive, especially for neurological patients). This may present significant savings in ongoing care costs, especially in high-risk patients [14].

PROPOSED SYSTEM

Virtual Physiotherapy is a provision/ facility where patients can do their physical exercises and get it validated by their mentors i.e. Doctors. There is no need of visiting Doctors physically, patient can exercise, and the data collected based on sensors is shared with Doctors with which doctor can provide feedback to patients.

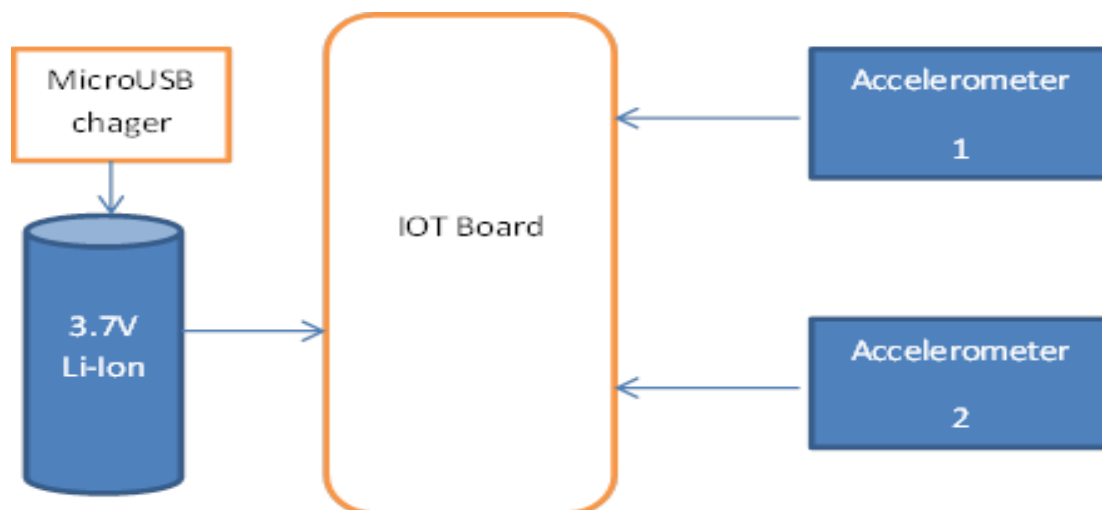


Fig.1: Block Diagram of System

Proposed system will get accurate position of the leg/hand or any body part on which the sensor is placed. Accelerometer will give 3 axis data i.e. X, Y & Z. We will get inclination of leg on which the sensor is placed. We will calculate the step count using this data.

Two sensor will be Placed at upper leg (Thigh) and lower leg(ankle). Accelerometer will give us accurate position of the leg (or any body part). Monitoring that position we will improve physiotherapy session effectively, which will further help to recover the patient speedily.

Logging the real time data on cloud “Google firebase” we will maintain physiotherapy activity logs. We can monitor activity live with the help of some java script and html based web page.

Data of Exercise performed be will stored on cloud. So that doctor could review it any time to give more effective treatment to patient. Whole system will operate on battery which makes it portable system.

The sensor consists of a 3-axis Accelerometer and 3-axis Gyroscope inside it. This helps us to measure acceleration, velocity, orientation, displacement and many other motion related parameter of a system or object. These values will tell the exact position and movement of body part. Data of Exercise performed will be stored in cloud, So Doctor could review it any time to give more effective treatment to patient.



Fig.2: proposed system

METHODOLOGY

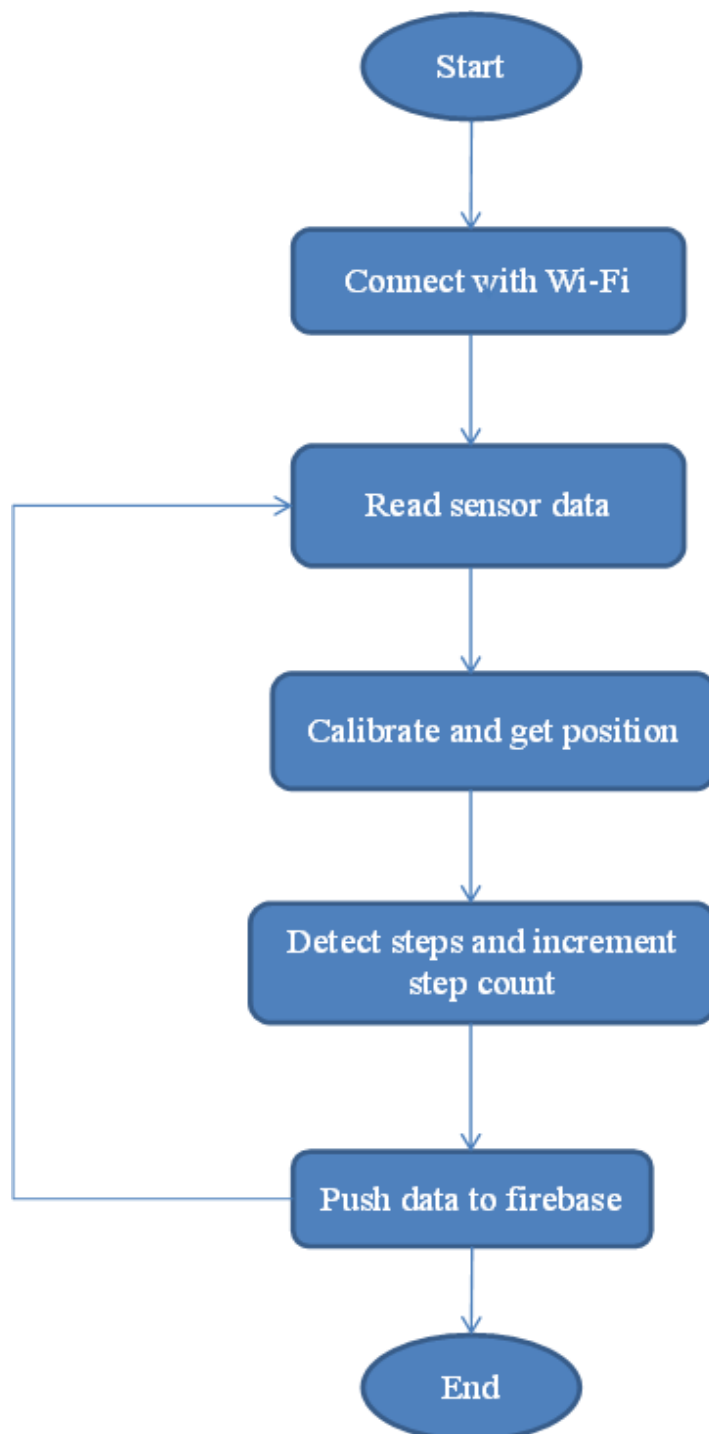


Fig.3: Flow work of system

We have connected proposed system with Wi-Fi for proving IOT access. After getting devise ready, the controller will read the sensor values. The sensors will be accelerometer which gives angle of joint between upper leg and lower leg and detect the position of leg or hand movement.

This sensor will connected to that body part which we need to monitor. The angle between two sensors will indicate the actual movement of that body part.

After getting sensors value, a system will calibrate it with reference values and give the actual position. On this position we will predict that the person is sitting, standing or walking.

Next step will be Detection of movements or steps (walk) performed. In case of walking, number of steps will also include in that data. This system will increment step count after every step. Each value calculated by sensor will be transmitted to Google firebase with the help of controller.

Sensors value will continuously transmitted throughout working session with time stamps. So that doctor can monitor it whenever he gets free time and then he give feedback to the patient. Controller will connect with IOT dashboard via Wi-Fi facility. After performing exercise, patient's record will be uploaded at goggle firebase, these data can be further monitored by doctor and give improvement report.

Proposed System's Web UI

username:

password:

knee joint analysis

patient name: xyz date:xx/yy/yyyy
under treatment:dr. abc


joint angle:90 degree Angle Display

step count:5

Gesture:stand/sit/walk/la
ying/jump...

view chart analysis

export report



Report of xyz					
Date	Time	Step Count	Joint angle	Gesture of body	improvement ratio
xx/yy/yyyy	aa:bb:cc	5	90°	standing	5%

RESULTS

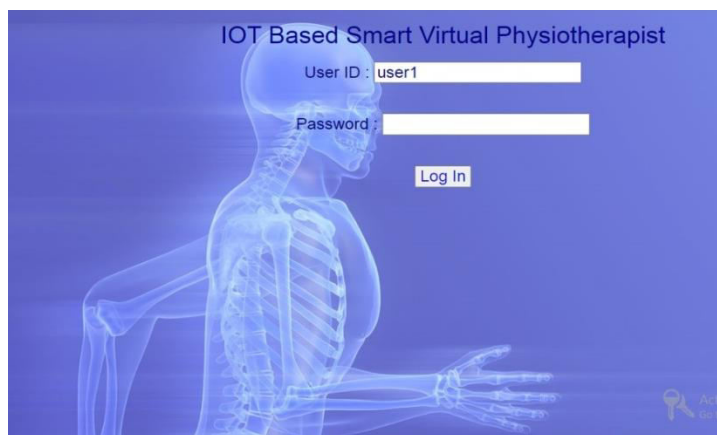


Fig.a Login page

Date	Time	Thigh Clock Angle	Lower Leg Clock Angle	Joint Angle	Gesture	Steps
2022-03-08	13:35:12	196.08	20.88	10.36	Bending	0
2022-03-08	13:35:11	196.08	20.88	10.36	Bending	0
2022-03-08	13:35:10	196.08	20.88	10.36	Bending	0
2022-03-08	13:35:09	196.08	20.88	10.36	Bending	0
2022-03-08	13:35:08	196.08	20.88	10.36	Bending	0
2022-03-08	13:35:07	196.08	20.88	10.36	Bending	0
2022-03-08	13:35:06	196.08	20.88	10.36	Bending	0
2022-03-08	13:35:05	196.08	20.88	10.36	Bending	0
2022-03-08	13:35:04	196.08	20.88	10.36	Bending	0
2022-03-08	13:35:03	196.08	20.88	10.36	Bending	0
2022-03-08	13:35:02	196.08	20.88	10.36	Bending	0
2022-03-08	13:35:01	196.08	20.88	10.36	Bending	0

Fig.b table for user data

Fig.c Final Output on Web UI

CONCLUSION

This paper reviews the importance of the task of restoring any injury / accident. Observation and control are important over and over again to avoid any permanent damage to the limb. The physician always monitors the patient's performance and provides feedback, in some papers we see the work pre-loaded in application-based applications, where the doctor has the right to change or combine any exercise based on the patient's condition. . Historical data helps the physician to diagnose the patient more accurately. In the future, other health sensors may be added to monitor body temperature, SPO2 (oxygen level), heart rate, etc.

The amount of data that can be obtained using advances in sensory and IoT technology, and the information provided by the analytical tool in IoT frameworks is enormous. There are a few studies on physiotherapy information systems. In addition, rare data exist associated with the integration of IoT technologies into physiotherapy or auto rehabilitation information systems. Since IoT data and information today are at risk of malicious use by hackers but also by unauthorized competitors, the design of information systems that support health care information security across all components of the information system is also a challenge for developers, leading to many rethinking previously developed health care models.

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IoT Based Pipeline Leakage Detection and Real Time Alert System in Gas Industry

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I. INTRODUCTION

Many people died and so many people were injured because of pipeline explosion in industries and there are so many accidents happened because of pipeline leakage it also affects agriculture.

Presently automation can be achieved in oil and gas industries by using PLC's that are communicated through SCADA. But for more convenience we are using GSM module. It can make quick decisions .IOT allows to control plant operation or enable complete plant automation from any location. By using IOT we can monitor all sites of assets from a centralized location. By using IOT we can also ensure safety and security during transportation and extraction of fuels. In this paper a solution is provided to prevent fire accidents by monitoring gas leakage detection and when leakage is detected we communicate the same with IOT network . We will switch off the particular leakage pipeline from the entire gas operation where leakage is detected. Fire alarms and sprinklers are also used for immediate action which will automatically on when sensor detect any kind of leakage .

II. LITERATURE SURVEY

Different approaches are employed to solve the problem of gas leakage.

B. B. Did paye, Prof. S. K. Nanda: In this paper author research on gas leakage detection and automated unified system for

LPG for that they use microcontroller and GSM module. The purpose of author was to develop a system for advance approach for Gas leakage detection, prevention and automatic booking system.

Srinivasan, Leela and Jeya bharathi, Kirthik, Rajasree: In this paper author give information on why gas leakage control is important and where we can use or implement this system .In residential commercial premises Gas leakage is a major concern. the gas leakage resulting has become a serious problem in household and other areas

Hitendra Rawat, Ashish Kushwah, Khyati Asthana, Akanksha Shivhare: In this paper author gives idea about security issues against hoodlums and fire mishaps. their work is to send the SMS to the number they gave for monitoring LPG leakage to avoid accident .when they receive alert the system automatically switch off.

P. Meenakshi Vidya, S.Abinaya, G.Geetha Rajeswari, N.Guna: In This paper author talk about the "Automation in gas detection and hazard controlling.

Baoyaing Z F Yaeo et al : In This paper author gives information based on embedded system about real time leakage monitor , it has been developed to detect the leakage over long distance of natural gas pipelines. For testing the performance of this method a network data acquisition and analysis system is built. This method is only used to detect leakage in gas pipeline.

Muhammad Ikmal : In this paper author Proposed a system name as electronic nose they work on (2 LPG sensors and 1 Temperature sensor) has been developed to monitor and control the gas leakage. It triggers an alarm and indicator lamps for detecting the leakage .

III. METHODOLOGY

The basic idea of the working of proposed model will be given by the flow chart given below:

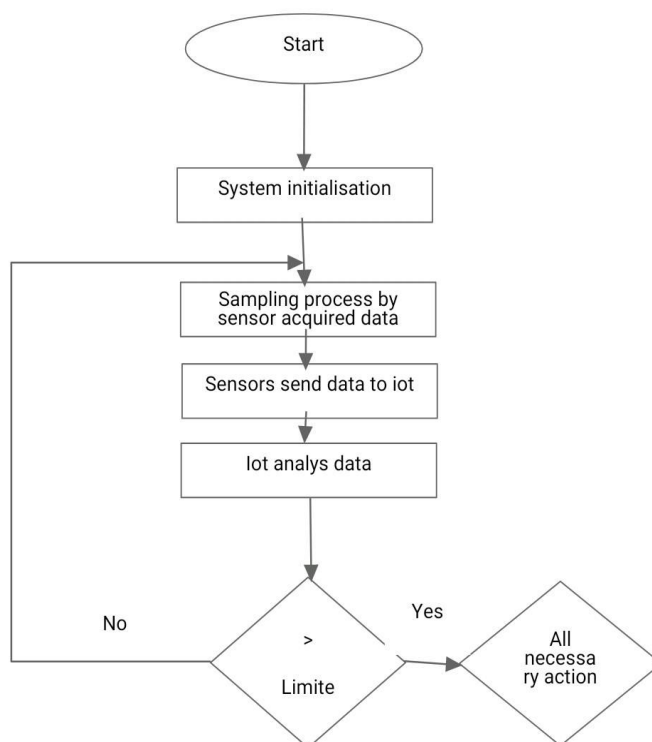


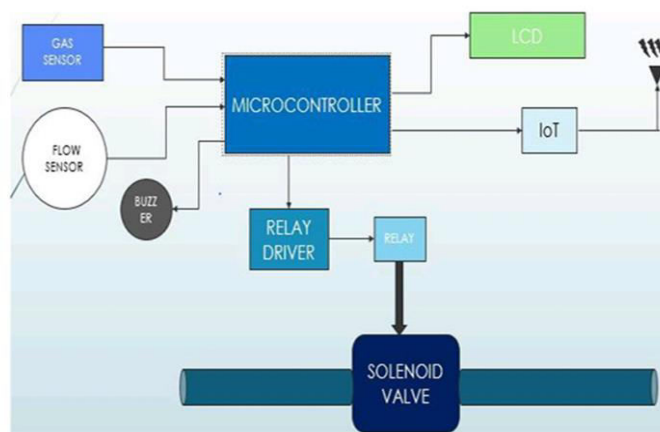
Fig 1: Flow Chart

The flow chart tells that when the initialization of the system start working in that case sensors start reading the data of the flow of the gas and after reading it by the sampling process, they acquire data, and the sensor sends the data to the IOT. After which the data analysis is done by the IOT, some value will be set in all the sensors if the value limit of the sensor exceeds or fall behind then necessary actions are taken by the IOT. Actions are audio and visual signal will be sent in the control room, the message with all the information like gas is leaked or not and if leaked then in how many percent it leaked along with the time. Meanwhile, the solenoid valve will close the pipeline in which the defect is observed. An alert will be sent to the numbers associated with IOT.

IV. PROPOSED SYSTEM

The Real-time Alert system detects the leakage immediately, which saves money, and oil, and the environment. IOT Leverages the combination of sensor of technology for monitoring the pressure, gas of liquid, compressor and check conditions, temperature, concentration, and other variables inside the pipeline. The invisible vapours indicate leaks which are detected by IOT sensors and real-time sensors which ensures safe Oil and Gas operations. Oil and Gas industry has highly dependent on the affected on consistent operation of the pipeline and other equipment. The sensors in engine detect the emissions and hence helps in avoiding huge losses. The system consists of 2 MQ2 gas sensors, 1 SQ1 flow sensor, 1 solenoid valve, a PIC16LF1526 microcontroller, a GSM module SIM900, Relay driver, LCD, Buzzer and a Transformer.

The Block Diagram of the Project as Follows



A. Gas Sensor MQ5

We are using the MQ5 Gas sensor module. This module is having two output possibilities – one analog out (A0) and other digital out (D0). The analog out are used to identify Gas leakage and to measure volume of leakage in specific units. The digital out are used to detect Gas leakage and hence trigger an message system (say a sound alarm or an message activation). The digital out gives two possible outputs – High and Low.

B. Arduino Uno

When arduino using digital out pin then connect the D0 pin of MQ5 module to any digital pin of arduino. Lets connect D0 to pin 7 of arduino. Now we need to provide power supply (Vcc) and have to complete the circuit by connecting to ground (Gnd). Take a +5V connection from arduino and connect it to Vcc of MQ5 module. Finally must have to connect the GND pin of MQ5 sensor module to GND of arduino.

When arduino using analog out pin, by this method, instead of connecting DO, connect analog out pin AO of MQ5 to any of the arduino analog pins. In this project, we are connecting analog out pin of MQ5 to A0 pin of Arduino. Connect Vcc and Ground.

C. LCD Display

Connections between LCD and Arduino:-LCD pin 1 VSS is connected to Arduino GND , LCD VCC is connected to Arduino 5V , LCD VEE/ Vo is connected to 10K Potentiometer middle pin, LCD RS is connected to Arduino D12 , LCD R/W is connected to Arduino GND, LCD E is connected to Arduino D11, LCD D4 is connected to Arduino D5, LCD D5 is connected to Arduino D4, LCD D6 connected to Arduino D3, LCD D7 is connected to Arduino D2, LCD LED A pin is connected to Arduino 3.3v, LCD LED K pin is connected to Arduino GND, Buzzer + is connected to Arduino pin D13 & buzzer (-) pin is connected with GND.

D. GSM MODULE SIM900

SIM900A Modem is made with Dual Band GSM based SIM900A modem from SIMCOM. Ideal voltage for this GSM module is 4.7v but we can also connect it with the 5v adaptor. As the ideal voltage for this gsm module is 4.7v to 5 volts, so any voltage above this can damage the gsm module. If we don't have the regulated 5v adaptor then we can also use an lm317t adjustable voltage regulator. As we can see sim900A module have so many pins which are clearly labeled but we will be using only 5 of these pins, the power supply pins, GND, Rxd 5v, and Txd 5v. The GND of the gsm sim900A module are connected with the Arduino of GND, Txd of the gsm sim900A has to connecte with the Arduino pin7 and finally, the Rxd of the gsm sim900A module will be connected with the Arduino pin8.

V. RESULT AND DISCUSSION

This project is used for the Gas/Smoke detection, once the Gas/Smoke is detected a message is sent to the owner. This Project can be installed in kitchens, Rooms, Industry, etc. This has an automatic system, a alert will be sent automatically whenever the gas or smoke is detected.

VI. FUTURE SCOPESCOPE

We can implement this model in industries because in industries many people die due to fuel leakage in pipeline. We can use this model on gas depot also for any kind of accident prevention. We can also use this in kitchen for preventing fire accidents and train yard where cylinder or gas liquid containers are kept. And by using GSM module we can send information anywhere or also setting reminder to check gas level.

VII. CONCLUSION

from cylinders, train yard where Gas or liquid container are kept In this paper we are providing a solution to prevent fire accidents by monitoring gas leakage detection and when leakage is detected we communicate the same with IOT . We will switch off the particular leakage pipeline from the entire gas operation where leakage is detected. Fire alarms and sprinklers are also used for immediate action which will automatically on when sensor detect any kind of leakage .

The basic idea of implementing this model is in the industries because industries are a place where many people die because of fuel leakage in the pipeline. It can also be used in Gas depot for preventing any kind of accident happen when gas leaks from the cylinder, can be used in Kitchen for preventing fire or leakage .

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Transformer Health Monitoring System Using IoT

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ABSTRACT

A transformer is one of the important pieces of equipment that is used in a power system. Monitoring the transformer for the problem before they occur can prevent faults that are costly to repair and change and that result in a loss of electricity and cost. The paper's main aim is to acquire real-time data of transformers remotely over the internet falling under the category of the internet of things (IoT). For this real-time, we used one temperature sensor, one potential sensor, and one current sensor for monitoring the temperature, voltage, and current data of the transformer and then sending it to the remote location. The Sensor affiliate with microcontroller some predefined value of the parameter is set in transformer if there is any defect for obvious nearly that data send forward with the help of wi-fi problem wi-fi module and this can get from any locate.

Transformer are very important device for transfer of electrical energy to protect transformer against different type of fault, various method gets used. In this system overload protection is established for protection of transformer. Relay connected to the microcontroller is used to protect transformer.

INTRODUCTION

Electricity plays an important role in our life. Every moment of our life depends upon electricity. Electricity has several components and equipment helping humans to transfer and regulate the distribution according to usage. The most crucial equipment for transmission and distribution of electric power is the transformer. In a Power system, an electrical component transformer directly distributes power to the low-voltage users and its operating condition is a criterion of the entire network operation. The majority of the devices have been in service for many years in different (electrical, mechanical, environmental) conditions. They are the main components and constitute a large portion of capital investment. Operation of distribution transformer underrated condition (as per specification in their nameplate) guarantees their long service life. However, their life is significantly reduced if they are subjected to overloading, heating low or high voltage current resulting in unexpected failure and loss of supply to a large number of customers thus is affecting system reliability. Overloading, oil temperature load current and ineffective cooling of the transformer are the major cause of failure in distribution transformer.

The output values of sensors are processed and recorded in the system memory. A system programmed with some predefined instructions to check abnormal conditions. If there is any abnormality in the system, details are automatically updated on the internet through serial communication. This Internet of Things (IoT) will help the utilities optimally utilize transformers and identify problems before any catastrophic failure occurs. Thus, the online measuring system is used to collect and analyze temperature data over time.

This work contributes a systematic review of associated benefits and an assessment of global technical potential for transformers. Specifically, we address IoT-based transformer system operations benefits and the global technicality of IoT in transformer systems.

The objectives of this work are to review the potential benefits associated with IoT-based transformer systems and estimate the global technical of IoT systems using the internet, publicly available datasets.

In IOT, interaction between the physical and digital worlds using sensors and actuators are carried out. A sensor or a network of sensors is used to sense the physical parameters or therespectiveenvironment. These processed sensor output are then send to the main server or cloud with the help of various network devices. The data can be accessed over internet from anywhere around the world. Monitoring and controlling form the basic objective of IoT technology. Hence IoT based monitoring is preferred more than manual monitoring. The system is a real time monitoring of transformer parameters such as voltage, current and temperature. This will help to identify the faults before a serious failure occurs.

PROBLEM STATEMENT

Distribution transformers are normally heavily loaded without frequent monitoring of their Kilo Volt Ampere (KVA) demand, operating temperature (i.e., that of the core winding and of the ambient) oil level and the moisture content developed in the transformer cooling medium, which is the oil. This results in sudden breakdown of transformers leading to loss of revenue. Again, during peak hours, field technicians and engineers travel to transformer sites to pick load amps to ensure transformers are overloaded. Modern power system requires accurate, reliable technique for detection of faults, real time data monitoring and fast response speed.

The reliable operation of the power system depends upon the effective functioning of the distribution transformer. Microcontroller based system has real time data monitoring, detection of abnormal condition, fast processing speed, reduced installation cost, low maintenance cost and more flexibility. Hence the development of an IoT based distribution transformer monitoring system which is a fully human machine interface device and does not require any human interference during its operations.

OBJECTIVE

The main objective of this proposal is to acquire live data of transformer health remotely over the internet using Internet of Things technology. We are going to monitor the transformer parameter such as temperature, current, level. These data will be sent over internet using TCP / IP protocol. From there we will able to read from anywhere of world location.

For this real-time aspect, we take one temperature sensor, one potential transformer and one current transformer for monitoring Temperature(T), Voltage(V), Current (I) data of the transformer and then send them to a remote location.

These three analog values are taken in multiplexing mode and connected to a programmable microcontroller. They are then sent directly to a Wi-Fi module under TCP IP protocol to a dedicated IP that displays the data in real-time chart form in any web connected PC / Laptop for display in different charts. The real-time data is also seen at the sending end LCD display interfaced with the microcontroller.

RELATED WORK

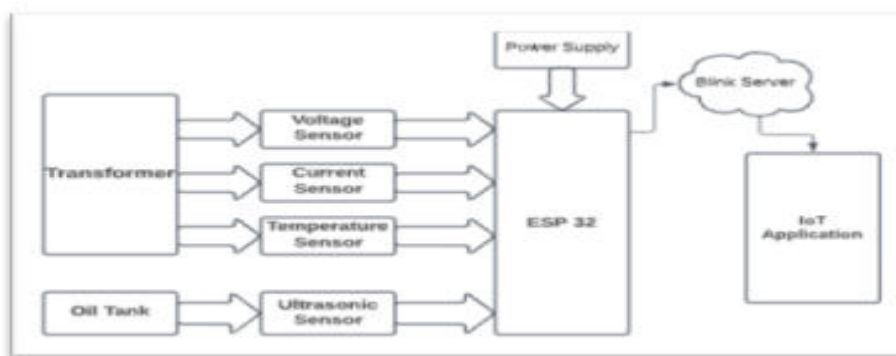
In most power companies, for online monitoring of power transformers, use supervisory control and data acquisition (SCADA) system, but for online monitoring of power transformer, the extending the SCADA system is an expensive proposition. Power transformers are currently monitored manually, where a person visits a transformer site, for maintenance and taking records purpose. But main drawbacks of these systems are, it cannot provide information about overloads (Voltage & Current) and overheating of transformer oil & windings. Due to these, the transformer life is reduced.

This paper represents a large number of power distribution transformer stations and they are far away from city, wireless GPRS transmission provides a good communication solution to supervise power distribution transformer stations. The scheme of remote wireless monitoring system for power distribution transformer station based on GPRS wireless network was designed in this paper. A control terminal system implement was mainly given, which adopted LPC2132 as main processor, GR47 as the date communication module. The monitor terminal software and flow chart were also designed. At last, the way of configuring the GPRS module to connect network is analyzed.

This paper represents a design and implementation of a mobile embedded system to monitor and record key parameters of a distribution transformer like load currents, oil level and ambient Modem, with a standalone single chip microcontroller and different sensors. It is installed at the distribution transformer site and the above parameters are recorded using the analog to digital converter (ADC) of the embedded system. The obtained parameters are

Processed and recorded in the system memory. If any abnormality or an emergency situation occurs the system sends SMS (short message service) messages to the mobile phones containing information about the abnormality according to some predefined instructions programmed in the microcontroller. This mobile system will help the transformers to operate smoothly and identify problems before any catastrophic failure.

PROPOSED SYSTEM



The proposed project is about acquiring real time status of transformer health parameters. Temperature, voltage and current of transformers are monitored and send over internet The live tracking of these parameters can be done using IOT technology from anywhere around the world. This is cost effective in nature. The internet of things is about connecting the unconnected things. It allows things to be accessible from the internet that historically have not been. The internet of things is able to improve quality of life for everyone by taking advantage of these connected things and data produced. The billions of m2m connections make possible everything in IOT. The process element leverages the connection between data, things and people to deliver the right information. To the right thing or person, at the right time, it is these billions of connections that add value. Distribution Transformers have a long life if they are operated under appraised conditions. Distribution transformers are as of now observed physically where a man intermittently visits a transformer site for support and records parameter of significance. This type of monitoring can't give data about incidental over-load and overheating of transformer oil and windings. Every one of these variables can essentially decrease transformer life.

Normal transformer measurement system generally detects a single transformer parameter, for example, control, current, voltage, and stage. While some ways could recognize multi-parameter, the time of acquisition and operation parameters is too long, and testing pace is not sufficiently quick.

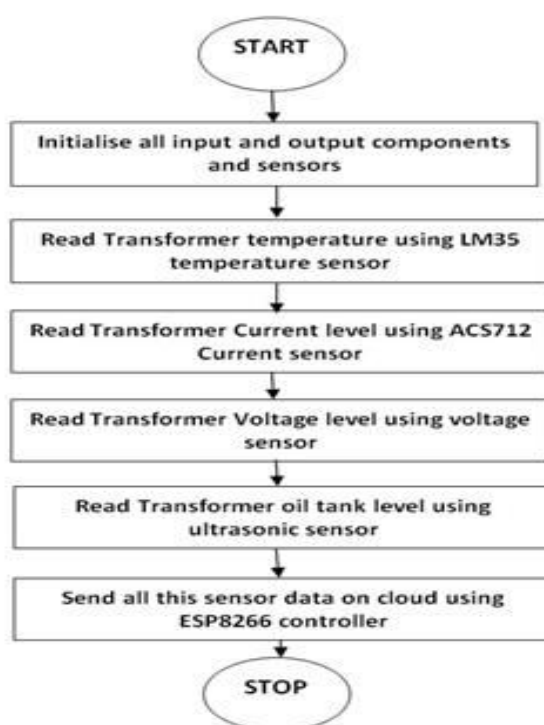
A monitoring system can only monitor the operation state or guard against stealing the power, and is not able to monitor all useful data of distribution transformers to reduce costs

Auspicious detection data will not be sent to observing centers in time, which cannot judge distribution transformers three phase equilibrium.

METHODOLOGY

The main objective of the proposed project is to receive real-time data of transformer remotely over the internet falling under the category of Internet of Things (IOT). For this real-time aspect, we take one DHT-11 which will detect value of temperature and humidity of transformer, one potential transformer and one current transformer for monitoring T, V, I data of the transformer and then send them to a remote location. These three analog values are taken in multiplexing mode and connected to a programmable microcontroller of 8051 families through an ADC 0808. Then the values of all the sensors are sent sequentially as per the frequency of multiplexing of the ADC by Microcontroller. They are then sent directly to a Wi-Fi module under TCP/IP protocol to a dedicated IP that displays the data in real-time chart form in any web-connected PC / Laptop for display in different charts. The real-time data is also seen at the sending end LCD display interfaced with the microcontroller.

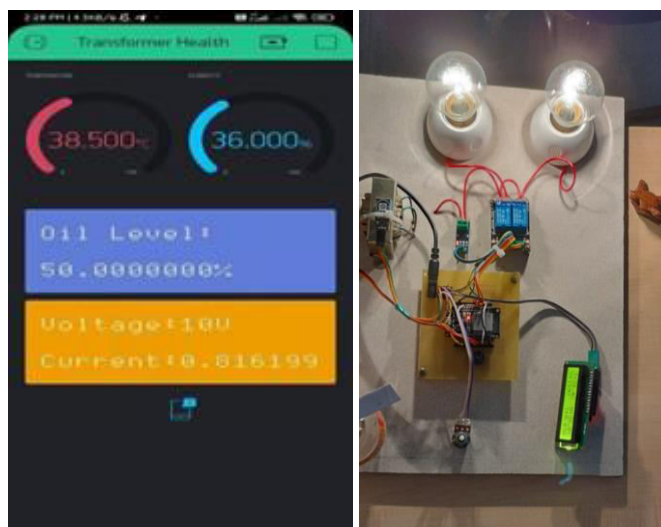
Flow Chart



RESULTS

- The transformer abnormal condition is results in variation in different parameters like temperature, transforms, oil temperature, ambient temperature.
- Improved system reliability highly efficient real time monitoring.
- Increase safety, problem is detected before they are hazard.
- Increased equipment efficiency condition related transformer losses can be corrected.
- Repair work can be properly scheduled.
- Components temperature is affected on the life of transformer, the transformer life increase it is main to maintain the temperature of transformer.
- This system improves efficiency of transformer and give accurate values.
- It provides us live data i.e.all current values of parameters (temp, voltage, oil level, current) .

Working Images



CONCLUSION

Electricity plays an important role in our life. Every moment of our life depends upon electricity. Electricity has several components and equipment helping humans to transfer and regulate the distribution according to usage. The most crucial equipment for the transmission and distribution of electric power is the transformer. In a Power system, an electrical component transformer directly distributes power to the low-voltage users and its operating condition is a criterion of the entire network operation. The majority of the devices have been in service for many years in different (electrical, mechanical, environmental) conditions.

They are the main components and constitute a large portion of capital investment. Operation of distribution transformer underrated condition (as per specification in their nameplate) guarantees their long service life. However, their life is significantly reduced if they are subjected to overloading, heating low or high voltage current resulting in unexpected failure and loss of supply to a large number of customers thus is affecting system reliability. Overloading, oil temperature load current, and ineffective cooling of the transformer are the major cause of failure in distribution transformer.

As a large number of transformers are distributed over a wide area in present electric systems, it's difficult to measure the condition manually of every single transformer.

So, we need a distribution transformer system to monitor all essential parameters operation and send data to the monitoring system in time. It provides the necessary information about the health of the transformer. This will help and guide the utilities to optimally use the transformer and keep this equipment in operation for a longer period. This Proposed project presents the design and implementation of an IoT embedded system to measure load currents, over-voltage, transformer oil level, and temperature. This is implemented by using an online measuring system using the IoT, with a single-chip Arduino microcontroller and sensors. It is installed at the distribution transformer site.

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Face Recognition Based Attendance System

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ABSTRACT

Face is the crucial part of the human body that uniquely recognizes a person. Using the face characteristics as biometric, the face recognition system can be provided. In conventional attendance system, the students are called out by the teachers and their presence or absence is marked accordingly. In this project, the Open CV based face recognition way has been proposed. The features are extracted using LBPH algorithm.

Keywords: LBPH, Open CV, camera, attendance, biometric, face recognition, firebase

INTRODUCTION

Attendance maintenance is a significant function in all the institutions to detector the performance of the students. Every institute does this in its own technique. Some of these institutes use the older paper or file based systems and some have adopted method of automatic attendance using some biometric techniques. A facial recognition system is computerized biometric software which is suited for determining or validating a person by performing comparison on patterns based on their facial appearances. This project may be helpful for the explanation of these types of difficulty. The number of students present in a lecture hall is detect, each person is identified and then the information about the number of students who are present I maintained.

OVERVIEW

Facial recognition among the several biometric techniques may not be the most genuine but it has various advantages over the others. The predicted system capture the face recognition approach for the automating the attendance procedure of students or employees without their involvement. The faces in the captured images are noticed and compared with the images in database and the attendance is marked.

IMAGE PROCESSING

The facial recognition process can be split into two major stages: processing which occurs before detection involving face detection and alignment and later recognition is done using feature extraction and matching steps.

FACE DETECTION

The primary function of this step is to conclude whether the human faces emerge in a given image, and what is the location of these faces. Face adjustment is performed to rationalise the scales and direction of these patches.

FEATURE EXTRACTION

Following the face detection step the descent of human face repair from images is done.

FACE RECOGNITION

The last step after the representation of faces is to recognize them. For automatic recognition we need to construct a face database. Then when an input image is fed the face observation and feature extraction is performed and its feature to each face class is compared and reserved in the database.

ALGORITHM

There are various algorithms used for facial recognition. Some of them are as follows:

1. Eigen faces
2. Fisher faces
3. Local binary patterns histograms

1. Eigen Faces

This method is a demographic plan. The characteristic which influences the images is obtain by this algorithm. The images from two different classes are not feasted individually.

2. Fisher Faces

Fisher faces algorithm also follows a continuous approach just like the Eigen faces. A Fisher face employs Linear differentiate Analysis for distinguishing between pictures from a different class.

3. Local Binary Patterns Histograms

This method needs the gray scale pictures for dissemination with the training part. This algorithm in connection to other algorithms is not a holistic approach.

Algorithm Training

For the tutoring purpose of the dataset of the facial images of the people to be recognized along with the special ID is required so that the presented accession will utilize the provided information for recognize an input image and providing the output. Same images require same ID.

Computation of the Algorithm

The intermediate image with upgrade facial characteristics which corresponds to the original image is assembled in the first step. Based on the parameters provided, sliding window theory is used in order to complete so.

Facial image is transformed into gray scale. A 3x3 pixels window is taken which can also be indicated as a 3x3 matrix which contains the intensity of each pixel (0-255). This value defines the new values captured from the 8 bystander. A new binary value is set for each bystander of the central value. For the values equal to or greater than the threshold value 1 will be the output contrarily 0 will be the output. Only binary values will be present in the matrix and the sequence is performed at each position to get new values at each position. Then the regeneration of this binary value into a decimal value is done which is build the central value of the matrix. It is a pixel of the actual image. As the process is completed, we get a new image which serves as the better predictable of the original image.

Extraction of Histogram

The image captured in the previous step uses the Grid X and Grid Y parameters and the image is cleave into multiple grids. Based on the image the histogram can be extracted as below: Let us suppose that there are 8x8 grids, then there will be 16.384 positions in total in the final histogram.

The Face Recognition

The training of the algorithm is done. Different accession are used for the calculation of distance between the two histograms.

Hence the result of this approach is the ID of the image which has the nearest histogram. It should return the distance calculated in the form of 'certainty'. If the certainty is less than the given threshold value, it implies that the image has been well identified by the algorithm.

ADVANTAGES OF USING LBPH ALGORITHM

1. It is one of the simple algorithms for face recognition.
2. The local character of the images can be characterized by this algorithm.
3. Using this algorithm, considerable results can be attained.
4. Open CV library is used to appliance LBPH algorithm.

LITERATURE SURVEY

[1] Automated Attendance System Using Face Recognition

Automated Attendance System using Face Recognition recommend that the system is based on face detection and acceptance algorithms, which is used to automatically detects the student face when he/she enters the class and the system is efficient to marks the attendance by recognizing him. When it is related to traditional attendance marking this system salvage the time and also helps to monitor the students.

[2] Face Recognition-based Lecture Attendance System

This paper proposes that the system capture the attendance unconsciously recognition obtained by regular observation. Continuous observation helps in estimating and improving the administration of the attendance. To obtain the attendance, positions and face images of the students commenced in the class room are captured. Through continuous conclusion and recording the system evaluation seating position and location of each one student for attendance marking.

Block Diagram

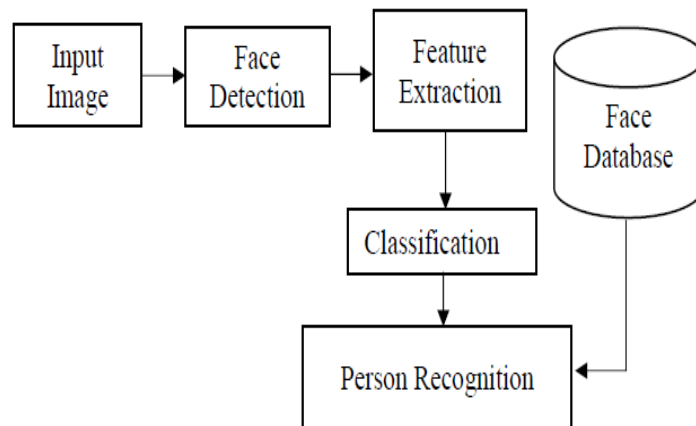


Fig 1: Block Diagram

Flow Chart

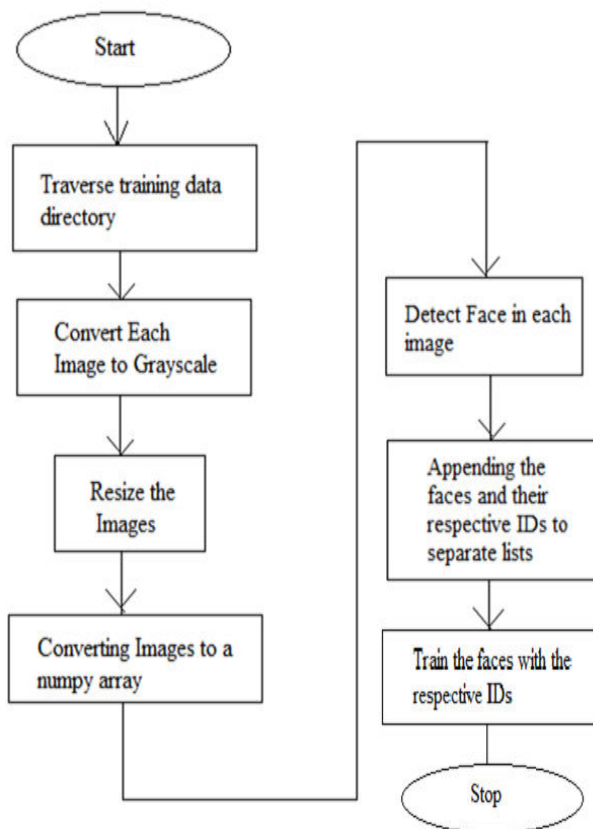


Fig 2:Flow-chart of Attendance Management System

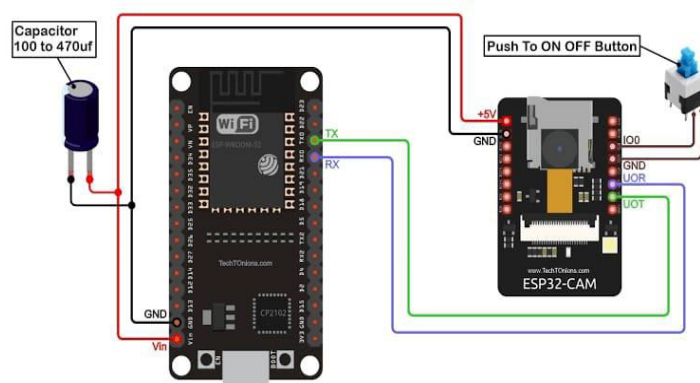
The instructing process starts with traversing of the training data directory. Each image in the instructing date is transformed into gray scale. A part of image is taken as center and threshold its neighbours against it. If the intensity of the middle part is more or same than its adjacent then denote it with 1 and 0 if not. After this the images are resized. Then the image are converted into a numpy library. Each face in the image is detected. Creation of separate lists of each is done and the faces are appended into them along with their respective IDs.

CONCLUSION

This paper features the most constructive Open CV face recognition method reachable for Attendance Management. The system has been appointed using the LBPH algorithm. LBPH excels other algorithms by assurance factor of 2-5 and has minute noise interference. Therefore LBPH is the most accurate and adequate

face recognition algorithm found in Open CV for the identification of the students in an educational institute and marking their attendance competently by averting proxies.

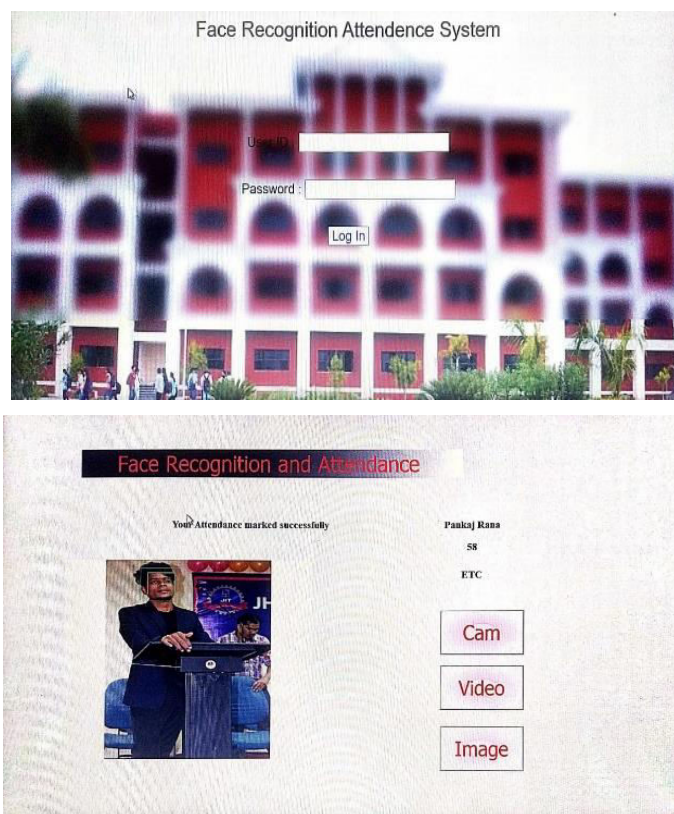
Circuit Diagram

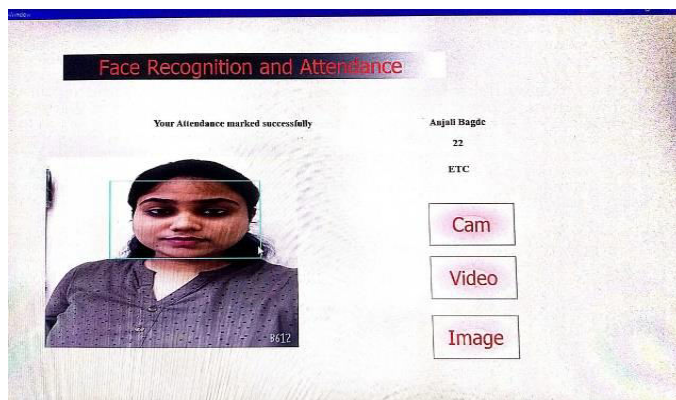
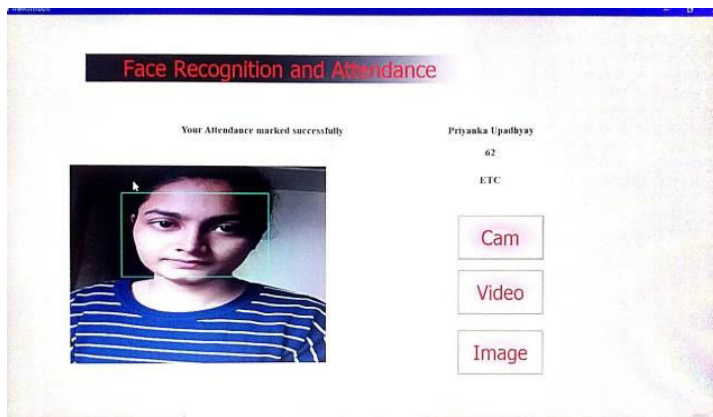


RESULT

The interface for the Smart Attendance System has been constituted. Using the interface the images of the separate students is being recorded and stored in the training dataset. Simultaneously their information is reserved in the database i.e. excel sheet. Finally the images of the students is being followed and recognized.

Image's





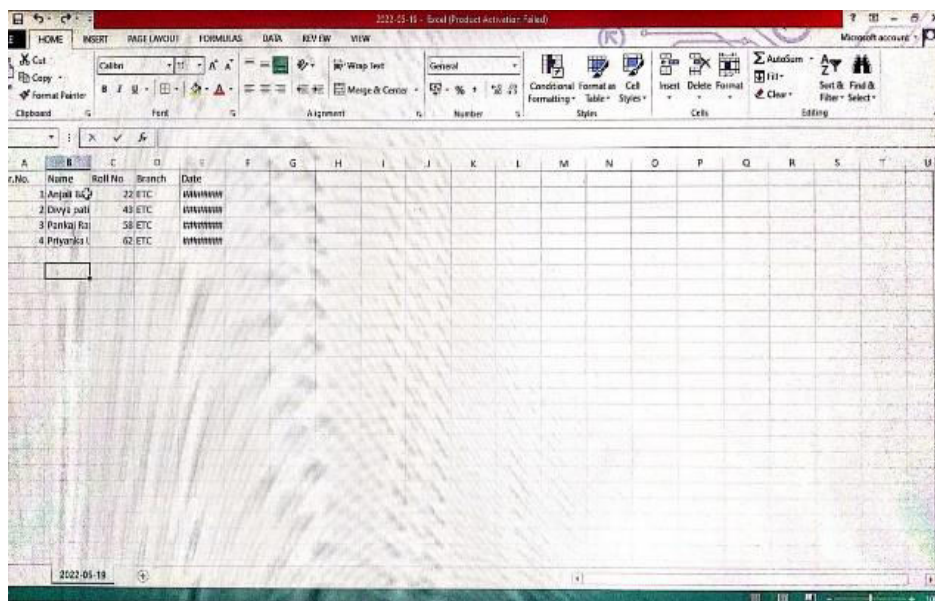
Face Recognition Based Attendance System

You Can Analyse attendance datewise

Today's Date: 2022-05-19
 Lecturere Name: null

Select Date: 19-05-2022

	Name	Roll No	Branch	Date
1	Anjali Bagde	22	ETC	2022-05-19
2	Divya patil	43	ETC	2022-05-19
3	Pankaj Rana	58	ETC	2022-05-19
4	Priyanka U. padhyay	62	ETC	2022-05-19



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Heart Attack Detection by Heartbeat Sensing Using Internet of Things

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ABSTRACT

The body sensor network automation is a specific core technology of IoT domain in healthcare technique, where a sick person can be tracked of his/her health using a collection of body parameters with the use of minute powered and flimsy wireless sensor nodes. The largely imperative intent of the endeavor was to craft a distant health care system. It's comprised of three focal sections. The earliest section being, revealing of patient's vitals via sensors, second for conveyance information to obscure storage and the third bit was providing the detect information for secluded performance. Secluded performance of the information enables a practitioner or custodian to scrutinize a patient's well-being progress missing from sanatorium property. The topical advancement in expertise and the accessibility of the Internet make it feasible to hook up a variety of campaign that can converse with each other and allocate data. Internet of Things (IoT) can be defined as the wireless unification of campaign which are allied to each other to allocate information and data in bid to commune and construct new information so as to trace and analyze it for hope exploit. The anticipated sculpt enable user to perk up health concurrent risk and shrink healthcare expenditure by collect, footage, analyzing and partaking huge information stream in genuine instance and ably. The notion of this venture come so to ease the nuisance of serene to break to practitioner each occasion he necessitates to ensure his blood pressure, pulse rate, temperature and so forth.

Keywords: Internet of Things (IoT), Arduino Uno, Blynk IOT

1. INTRODUCTION

Due to the hi-tech advance in the present day, there is huge assortment successively feeler construal imperative cipher such as blood pressure, heart rate monitor, counting electrocardiograms, which tolerate patients to take their crucial cryptogram day by day. The interpretations which are engaged on a daily basis are remitting to doctors and they will counsel the linctus and drills routine that allow them to progress the worth of life and surmount such disease. The internet of things applied to the heed and monitoring of patients. This manuscript proposes a vigour monitoring system which is capable of detecting manifold stricture of our body such as blood pressure, temperature, heart rate. An incessant record of body can be used to distinguish an illness in more competent way. Anticipated system consists of a temperature, blood pressure, pulse sensor, and Arduino system is competent of measure pulse rate, temperature and blood pressure of infant to ripened person. Low cost of contrivance assists to grant apposite handy inaccessible base effectual heart rate monitoring system. Now, Internet of Things (IoT) has become one of the most authoritative communication paradigms of the 21st century. It is chiefly a compilation of low-power and glare credibility wireless sensor nodes that are used to scrutinize the human body function and contiguous environment. Since BSN nodes are used to accumulate perceptive (life-critical) information and may manoeuvre in antagonistic environments. Consequently, they entail austere refuge mechanism to prevent cruel dealings with the system.

2. SYSTEM ARCHITECTURE

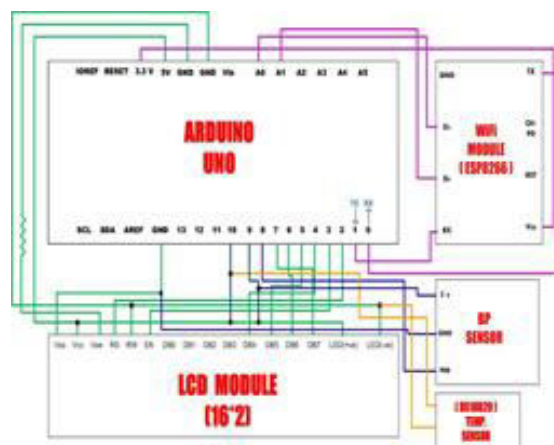


Fig: Hardware Model

The universal intend of IoT application can be partition into three Layers: the detecting layer, the convey stratum and the application layer. In the Detecting layer to appraise the body temperature we Utilized DS18B20 body water contravene body temperature feeler. To assess the heart beat Rate of the patient by utilizing pulse sensor amped is utilized. It has its own fastidious an envisage to depiction the heart beat waveform, BPM. It gives the data about whether the patient is sitting, resting, sleeping, walking, jumping or frontbend and diverse circumstances. To recognize the Blood pressure and Pulse rate we utilized sunrom BP sensor. This Bio data from the sensors is tartan unremittingly in Arduino utilizing the consecutive scrutinize. In the Transport layer we remit the information to the cloud by utilizing the Arduino with the aid of Wi-Fi Module ESP8266.

Here we make use of the open cloud server i.e. "Thingspeak" to build it easily reached in cloud, with the end target that the data can be go to anywhere on the planet. Here in the Thingspeak server we make an own account and we make a our private channel by the name of our collage. So by making the own channel we get a remarkable id and API-key to compose the information to the cloud. This API key is use while programming in Arduino with the purpose that the information is put in the server and at the application layer we can recover the information by the use of one of a kind API key to such an extent that the information can be obtained from the server. The proposed health monitoring system that enough to monitor the patient automatically using IoT. It collects the status information through these systems by including patients heart bit rate, blood pressure and temperature and sends it on Thingspeak with his current status and full medical information. This would help to the doctor to monitor his patient from any-where and anytime and also to send to patient his health status directly without visiting to the hospital. This system can be deployed at various hospitals and medical institutes for reducing the time. The system uses smart sensors that generates the data information and collected from each sensor and send it to a database server i.e. hospital where the data can be further analysed and maintained to be used for the medical experts.

3. PATIENT MONITORING ELEMENTS

A. Body Temperature Sensor

The DS18B20 is the one of the best reasonable sensor for measuring the human body temperature (exact to $\pm 0.5^\circ\text{C}$ over the extent of -55°C to $+125^\circ\text{C}$). We can put these sensors at different spots of the human body like on forehead, under arms and even under the tongue on account of its waterproof. The DS18B20 has three wires i.e. VCC, GND, DATA are mounted in a solitary wire. The DS18B20 uses Maxims exclusive 1-Wire bus protocol that implements bus communication using one control signal. The control line requires a weak pullup resistor since all devices are linked to the bus via a 3-state or open-drain port (the DQ pin in the case of the DS18B20). In this bus system, the microprocessor (the master device) identifies and addresses devices on the bus using each device's unique 64-bit code. Because each device has a unique code, the number of devices that can be addressed on one bus is virtually unlimited. The 1-Wire bus protocol, including detailed explanations of the commands and time slots, is covered in the 1-Wire Bus System section. Another feature of the DS18B20 is the ability to operate without an external power supply. The core functionality of the DS18B20 is its direct-to-digital temperature sensor. The resolution of the temperature sensor is user-configurable to 9, 10, 11, or 12 bits, corresponding to increments of 0.5C, 0.25C, 0.125C, and 0.0625C, respectively. The default resolution at power-up is 12-bit.



Fig-2: DS18B20 Temperature Sensor

If the DS18B20 is configured for 12-bit resolution, all bits in the temperature register will contain valid data. For 11-bit resolution, bit 0 is undefined. For 10-bit resolution, bits 1 and 0 are undefined, and for 9-bit resolution bits 2, 1, and 0 are undefined. Table 1 gives examples of digital output data and the corresponding temperature reading for 12-bit resolution conversions.

Applications

Since each DS18B20 contains an ideal silicon serial number, more numerous DS18B20s can exist on the same 1Wire transport. This considers putting temperature sensors in a wide range of spots. Applications where this component is valuable incorporate HVAC natural controls, detecting temperatures inside structures, gear or apparatus, and process checking and control.

A. Sunrom Blood Pressure and Pulse Sensor

This sensor is has Intelligent automatic compression and decompression system which makes it easy to operate with switching button to start the measurements with Large-scale digital liquid crystal display screen.

It plant on 200mA regulated current from 5v power supply. Its Output Format is Serial Data at 9600 baud rate(8 bits data, No parity, 1 stop bits). Outputs three parameters in ASCII. Blood pressure is the fretfulness of the blood in the arteries as it is pumped around the body by the heart.

When your heart beats, it contracts and pushes blood through the arteries to the respite of your body. This oblige creates pressure on the arteries. Blood pressure is recorded as two figures the systolic anxiety (as the heart beats) over the diastolic anxiety (as the heart relaxes between beats). The unit which course this is called Sphygmomanometer. Monitoring blood pressure at home is imperative for many people, chiefly if you have high blood pressure. Blood pressure does not reside the same all the instant. It changes to convention your body's wants. It is pretentious by assorted factors counting body position, breathing or emotional state, exercise and sleep. It is best to appraise blood pressure when you are relaxed and sitting or lying down.

High blood pressure (hypertension) can pilot to solemn nuisance like heart attack, stroke or kidney disease. High blood pressure (hypertension) can lead to grave exertion like heart attack, stroke or kidney disease. High blood pressure usually does not have any symptoms, so you need to have your blood pressure chequered habitually.

Features

1. Intelligent involuntary compression and decompression
2. Easy to manoeuvre, switching button to start measuring
3. 60 store groups reminiscence measurements
4. Can interpret single or all measures
5. 3 minutes involuntary supremacy cut back appliance
6. Intelligent device debugging, routine clout to perceive
7. Local tests for : wrist fringe as 135-195mm
8. Large-scale digital liquid crystal flauntscreen, Easy to Read Display

	Systolic (mm Hg)	Diastolic (mm Hg)
Hypotension	< 90	< 60
Desired	90-119	60-79
Prehypertension	120-139	80-89
Stage 1 Hypertension	140-159	90-99
Stage 2 Hypertension	160-179	100-109
Hypertensive Crisis	≥ 180	≥ 110

9. Fully Automatic, Clinical Accuracy, High-accuracy
10. Power by External +5V DC
11. Serial output data for external circuit processing or display.

Specification

1. Working Voltage: +5V, 200mA regulated
2. Output Format: Serial Data at 9600 baud rate (8 bits data, No parity and 1 stop bits). Outputs three parameters in ASCII.
3. Sensing unit wire length is 2 meters

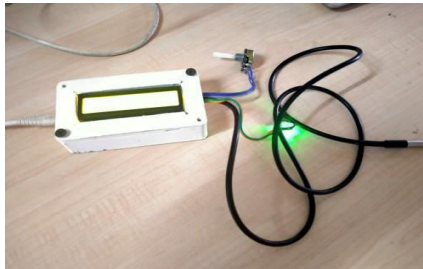


Fig-3: Sunrome heartbeat sensing and Pulse Rate Sensor

Sensor Pinouts

1. TX-OUT = Transmit output. Output serial data of 3V logic level usually connected to RXD pin of microcontroller/RS232/USB-UART.
2. +5V = Regulated 5V supply input.
3. GND = Board Common Ground.

High blood pressure (hypertension) can lead to serious problems like heart attack, stroke or kidney disease. High blood pressure usually does not have any symptoms, so you need to have your blood pressure checked regularly.

Classification of blood pressure for adults (18 years and older)

B. Wi-Fi Module ESP8266

The ESP8266 is low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller competence fashioned by Shanghai-based Chinese manufacturer, Express Systems. The chip first came to the thought of western makers in August 2014 with the ESP-01 module, made by a third-party firm, Ai-Thinker.

The ESP8266 Wi-Fi Module is a self-restricted SOC with incorporated TCP/IP protocol stack that can give any microcontroller entrée to your Wi-Fi network. The ESP8266 is accomplished of either hosting an application or offloading all Wi-Fi networking functions from another claim workstation.



Fig-4: ESP8266 Wi-Fi Module

Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can merely Clip this up to your Arduino contrivance and get about as much Wi-Fi-ability as a Wi-Fi shelter offers.

The ESP8266 module is an exceedingly cost effectual timber with a colossal and still budding, community.

ESP8266 Module Pin Description

1. 3V3: - 3.3 V Power Pin.
2. GND: - Ground Pin.
3. RST: - Active Low Reset Pin.
4. EN: - Active High Enable Pin.

5. TX: - Serial Transmit Pin of UART.
6. RX: - Serial Receive Pin of UART.
7. GPIO0; GPIO2: - General Purpose I/O Pins.

Features

Processor: L106 32-bit RISC microprocessor core based on the Tensilica Xtensa Diamond Standard 106 Micro running at 80 MHz

1] Memory:

1. 32 KiB instruction RAM
2. 32 KiB instruction cache RAM
3. 80 KiB user-data RAM
4. 16 KiB ETS system-data RAM

2] External QSPI flash: up to 16 MiB is supported (512 KiB to 4 MiB typically included)

3] IEEE 802.11 b/g/n Wi-Fi

4. RESULTS

The graphical representation of the information of the patient-1 is demonstrated i.e. body temperature, Heartbeat, blood pressure are as showed up in the fig which is observed by signing into the Thingspeak server through a personal computer which has Time in x-axis and the parameter in y-axis

5. CONCLUSION

The proposed system collects the health status of a patient by connecting the different sensors to the body. The collected data is displayed on LCD and also stored in IoT server. The doctor can view the patients health condition by login into the web portal. From the evaluation and the result obtained from analysis, the system is better for patients and the doctor to improve their patients' medical evaluation.

6. FUTURE SCOPE

The system can be extended by adding more features to the mobile application like linking the ambulance services, leading doctor's list and their specialties, hospitals and their special facilities etc., Doctors can create awareness about diseases and their symptoms through the mobile application.

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Design and Development of IoT and Raspberry PI Based Digital Notice Board

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ABSTRACT

In our daily life the notice board is the primary thing in many places like malls educational institutions, public places like bus stops, railway stations, collages, etc but sticking various notices day to day is tedious process and also the man power is required for it and the paper is made of pulp of tree so it effects the nature. This project is about advanced wireless notice boards. Raspberry pi and iot are used at the transmitter. According to user requirements we can edit the data. At the transmitter, an authorized PC or mobile is used for sending messages or notices. The message or notices send by the authority is received by the receiver. This message may be in the form of voice or image.

Keywords: Android system, Web server, Raspberry pi circuit board, LCD Display, Electronics components

INTRODUCTION

Notice board is a crucial statistics gathering machine in our life. In our daily lifestyles we can see be aware boards in more than a few places like, instructional institutions, railway stations, shopping malls, Bus stations, workplaces etc. So we can say that Notice boards are the locations to leave public statistics such as as advertise events as announce events or grant attention to the public, etc. Now days a Separate character is needed to stick those informations on the be aware board. It will lead to lose of time as nicely as utilization of manpower. In conventional analog type notice boards paper is the main medium for data exchange. We know that informations counts are endless. So there is a usage of large amount of paper for displaying those limitless counts of informations.

The problems confronted by way of the wooden or conventional type be aware boards are resolved through the implementation of our digital note board. It will convey an advanced ability of passing notices round in the world in a a whole lot less complicated and efficient way. Due to the popularity of internet, we choose web as a medium for transferring informations. The Internet of things (IoT) is the community of bodily devices, cars home appliances and other objects embedded with electronics. Software, which permits these objects to connect and exchange data. Each gadget is uniquely identifiable thru its Embedded computing machine however is capable to inter function inside the existing Internet infrastructure For supply security, we add username and password type authentication system. So solely respective authority can send informations. Raspberry pi which is the Heart of our system. A display is interfaced with Raspberry Pi. So informations in the shape of text, photo and pdf can show on the massive screens. Our fundamental purpose is to get more people's attention on the display. By the usage of excessive definition show devices humans can get more attention on the note board alternatively than conventional be aware boards. In conventional wireless word board can show solely texted messages. But in our newly applied machine can display pictures and pdf documents in addition to text messages. Because in Educational institutions majority of informations given from the higher authorities in the structure of photos or pdf format. So exhibiting these types of informations make our device more person friendly. Due to the utilization of net the sender can ship message somewhere in the world.

PROBLEM STATEMENT

We are trying to replace or provide alternate solution for actual physiotherapist with smart virtual physiotherapist system as current scenario demands social distancing. As we are going through the pandemic, we came to know lot many other things than the normal day today life things. Most important is to maintain social/physical distancing. Maintaining this we were unable to do many activities which are depending on others like gym trainer, physiotherapist etc. Our ultimate motive is to resolve this issue with the help of this proposed technology.

OBJECTIVE

The main objective of this study was to compare the time and movement steps during actual physical therapy with the time-to-work measurements (i.e. the time the patient was physically active) acquired through a wireless body area network (WBAN) modified 3D accelerometer modules. in Thai and Lower leg.

The secondary objective was to assess the entire activity log from anywhere with the help of IOT and cloud.

□ Main objective is to build a virtual physiotherapist i.e. a smart device will be our physiotherapist.

- Provide virtual assessment.
- Sending information to google firebase to maintain session activity logs.
- Monitoring and analyzing patient's health and continuous improvement.
- An ultimate goal is to develop an IOT enabled Smart Physiotherapist.

RELATED WORK

During the development of human civilization, various health care models were developed, namely: i) a biomedical model, based on diagnostic equipment, focusing on physical or biological processes (i.e., physiological or cellular changes or cellular structure in the human body) without considering the role of social factors, and environmental, or individual perspectives (effective health care services that focus on treatment and minimal prevention are more focused on the medical model ii) public health decision model psychosocial bio model and a complete model . Efforts are being made to integrate the relationship between the various aspects of health care, including demographic, social, environmental, and epidemiologic conditions.

The new approach to health care is of increasing importance especially in western countries, where the burden of care, higher health costs and social care, and the greater impact of co-morbidities are associated with population aging and a growing rate of disability [Health information systems (such as Electronic Health Records (HER), Electronic Medical Records (EMR), electronic instructions and reporting, electronic authorization, evidence-based support, and prevention of disease prevention) promise to contribute to the continuation of health care services, growth . quality and efficiency of health care, which includes services related to knowledge of care, care management, care coordination, and financial responsibility the importance of addressing the maintenance of functional autonomy for people with moderate to moderate disabilities was emphasized in several care models, where social, technical or environmental factors were considered in health care systems. As the accessibility and efficiency of the health care system is influenced by many factors (i.e., unnecessary testing of health care users; social services for the weak, the disabled. For example, the Canadian PRISMA Integrated Service Delivery System integrates among other features: single entry point; case, individualized, administrative process; a self-assessment tool based on client performance management; better communication tools, within and between health care services The Cerner Millennium Electronic Health Records program developed by the U.S. Department of Defense for Veterans Affairs, for people with disabilities is an information system where technical challenges and solutions are discussed in scientific literature.

This information system has promoted management development. This information system proposed improvements in veterinary care management by taking into account their social and health care needs [8Examples of health care models that consider the integration of environmental knowledge into comprehensive health care decisions are: The Sustainable Development Service Unit established in 2008, focusing on achieving environmental, social and financial sustainability within the English healthcare system and the Australian Medical Association's recommendation for environmental sustainability that should include stakeholders such as Australian Environmental Physicians, the Australian Healthcare and Hospital Association, The Royal Australian College of Physicians, and academics [

A series of reports and documents distributed by the European Council have suggested: improvements in the quality of life of people with disabilities, which should be based on a rational assessment of their status, strengths and needs; the creation of jobs that create a healthy environment for physical and mental health; the development of support structures around people with disabilities in need of inclusive support; provision of quality health care services to people with disabilities; development of programs and services to meet the needs of people with disabilities

PROPOSED SYSTEM

Figure below shows the Block plan for the proposed system. The principal goal of the device is to improve a wi-fi be aware board that displays notices in the shape of image, text, pdf. It uses a Raspberry pi as a processor. Raspberry pi is outfitted with a Portable Projector/LCD display. We can show messages and can be without problems set or changed from anywhere in the world. In addition cellular software is used to convert voice into text. Here the voice is pass through the voice reorganization device and converted into text

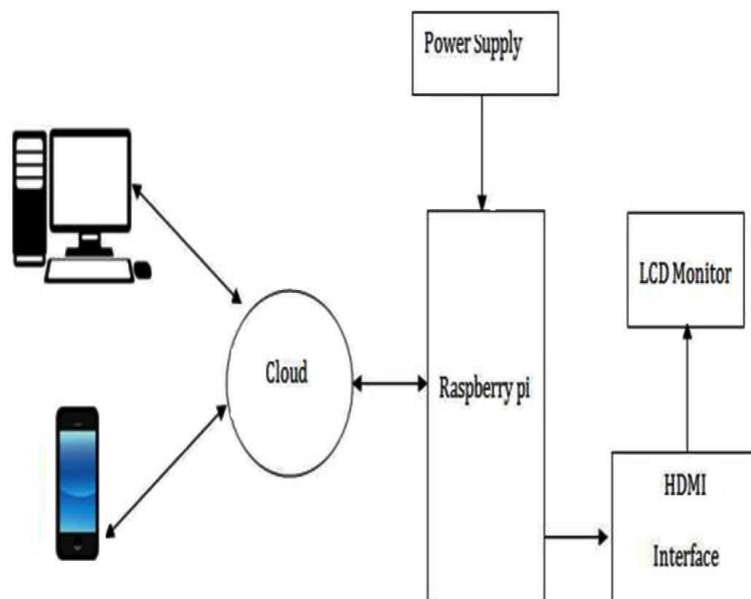


Fig.1: Block Diagram of System

The device will send this message to cloud. Then it passes to the observe board which is connected to internet with the aid of Wi-Fi. The processor, procedure it and displayed on the screen. We can send the message to all the screens or desired display

METHODOLOGY

In this section we have to discuss about the procedure and methodology of "digital notice board using IoT and Raspberry Pi" which have been used for the implementation. Following are the modules associated with our digital notice board using IoT and Raspberry Pi which helps an individual to easily update the notice .

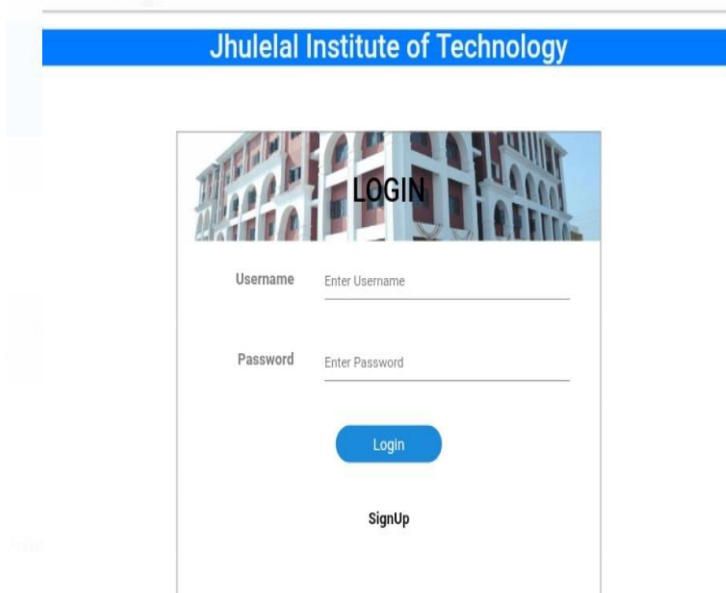


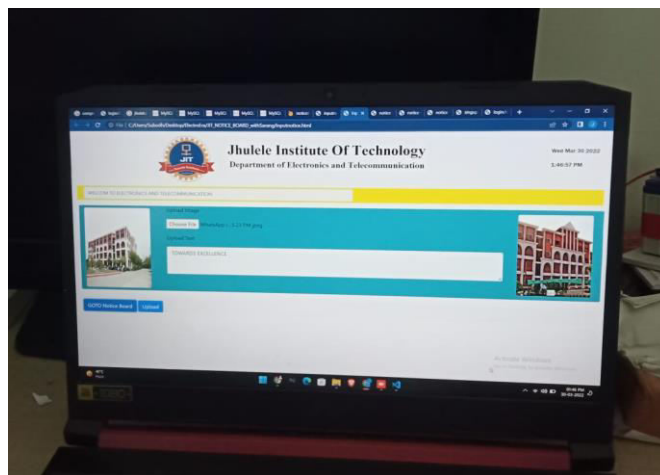
Fig: login page

A. Login

User needs to get login into the web-page for uploading the notice for display. By using this technique the user can be directly able to display notice from android phone.

B. Authentication

The purpose of the authentication is to see that whether the user who login have been the user id and password by admin. The Authentication is provide mainly for to prevent unauthorized access, only the faculty of collage or an individual who have been authority for uploading the notice on notice board .



C. Displaying Notice on Notice Board

To display a certain notice, at first the user has to enter the notice on the input page which has been helpful for displaying the notice on the digital notice board. The notice is entered in a software which is Firebox and displayed on the hardware device. The interface between software and hardware is the Raspberry Pi module. The message to be displayed is sent from the authority to Firebox. The Raspberry Pi has received the notice and displays it on the digital notice board.

D. Display Previous Notice

There is another function called as display previous message. When the authority updates the message, so the previous message is auto shifted to the downward side of the display and the updated message displays on the upward side of the display.

E. Logout

When the notice updating work has been completed, the user can log out.

Data Flow Diagram

User can send text through Raspberry Pi using an Android application. If the user is not authenticated, he will not send the text. Only authorized users send the text.

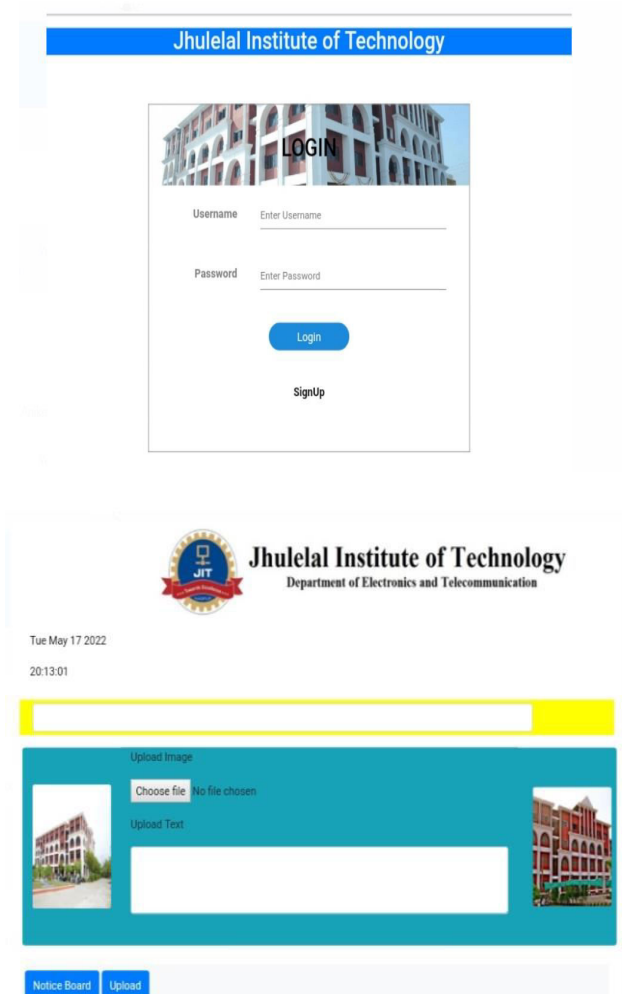


Algorithm

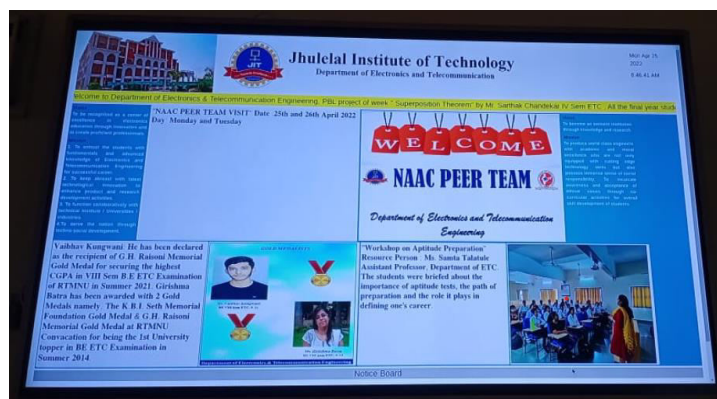
Following step by step procedure will explain the actual working of the system

1. Start
2. Login for access is aware board.
3. If the consumer is legitimate then go to step 4 in any other case go to step 2.
4. Select Informations in the structure of image, pdf and text files
5. Upload files.
6. Store the message.
7. Set the length of displayed messages.
8. Set maximum restriction for the size of image to be displayed.
9. If the acquired image is less than the limit it will without delay displayed. Otherwise image will resized.
10. When pdf is acquired it will converted to image.
11. Received picture and text files
12. Display stored messages in First in first out order (FIFO)
13. Check for new notice. If it manifest go to step 8.else go to step 9
14. Repeat above steps when strength grant maintained.
15. Stop

Proposed System's Web Ui



RESULTS



CONCLUSION

The project of “iot and raspberry pi based digital notice board” has been successfully implemented .As the technology is greeting advanced features of digital notice boards are also enhanced. Using this we can save time and cost. We hope that our projects can become commercial and can be used in many places like colleges, malls and railway stations. We can conclude that this project has further scope for development of our country and city .And we hope that this project will be implemented in future also.

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Design and Development of IoT Including DHT11, RS481 & ULN2003 Interface Used for Industrial Communication System

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ABSTRACT

The Internet, an uprising invention, is always converting into some new kind of hardware and software accomplishing it unavoidable for every single person. Many of search on internet is word with IoT, what you thinking about it really existing or it is only virtually. But our future depends on IoT, it is the based on artificial intelligence(AI) proficiency. IoT main objective is to compact everything all around us in the world and control the system. This paper motive to provide overview that how IoT used in the electronics boards which is only perform specific task for the perticular area. We are doing that board gather it in one board for industrial purpose and it ovecome to complexity of circuit.

Keywords: IoT, Microcontroller, DHT11, RS485, I2C, ULN2003.

1. INTRODUCTION

The Arduino board can be programmed to do anything by simply programming the microcontroller on board using a set of instructions for which, the Arduino board consists of a USB plug to communicate with your computer and a bunch of connection sockets that can be wired to external devices like motors, LEDs etc.

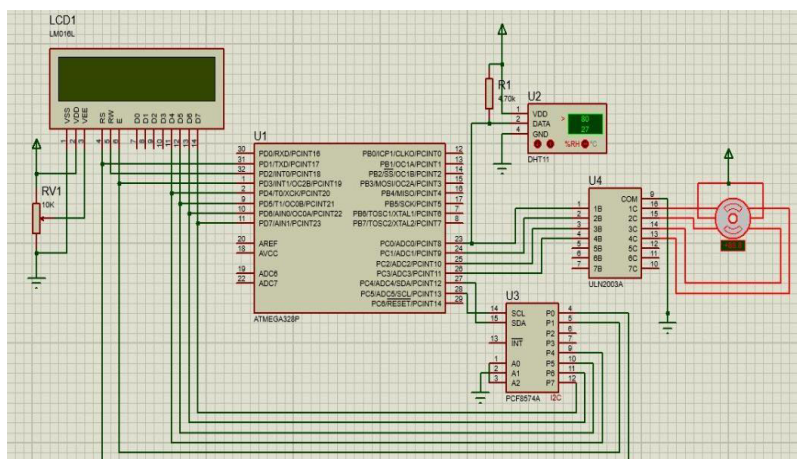
The aim of Arduino is to introduce the world of electronics to people who have small to no experience in electronics like amatur, designers, artists etc.

Arduino is base on open source electronics project i.e. all the design specifications, simplified, software are available openly to all the users. Hence, Arduino boards can bought from seller as they are commercially available or else you can make your own board by if you wish i.e. you can download the simplified from Arduino's official website, buy all the components as per the design specification, collect all the components, and make your own board.

2. OBJECTIVE

1. Design & development of IOT including
2. DHT11, ESP8266, ULN2003 interface used for industrial communication.
3. Do not need to connect external components.
4. It provides in one PCB bord.
5. To enhance critical thinking.
6. To increase student's thinking ability by produce new invention that can make people life easier.
7. To Exposed students with teamwork project as preparation for work lifestyle in future.

4. METHODOLOGY



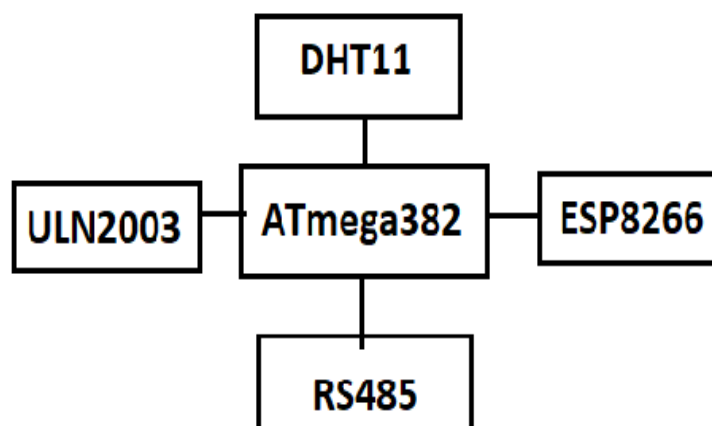
In this section we have to discuss about the methodology of " design and development of circuit board" which have been used for the implementation. For software requirement , I have choose Proteus and esayde software . We first did it with proteus softwar for the circuit diagram then after that the layout diagram was made on esayde software. The software is mainly to creat electronic prints for manufacturing or printed circuit board. After that the layout diagram was printed on photo paper with laser print and ironed on pcb plate. Laser print comes on the pcb plate .Then put the pcb plate in the FeCL3 liquid mix water until the colour of the pcb plate changes. Cleaned the pcb plate with thinner and made holes for mounting the components on it . Then the components are mounted on the pcb plate by soldering .The components are

4. COMPONENTS

1. Atmega328p
2. DHT11
3. ULN2003
4. L293D
5. MAX232
6. MAX485
7. PCF8574AN
8. ESP8266
9. LCD
10. CRYSTAL OSCILLATOR
11. 22uF Capacitor
12. 10k and 220ohm resistors
13. DB9 Female Connector

Components add 4.7k resistor instead of 220 ohm.

5. WORKING



Project which titled is "design and development Board of IoT including DHT11 Rs485 and ULN2003 interface used for industrial communication system". In this development board be used a totally 6 ICS and two external boards. We know that arduino,it is a development board which has various types of a features.

Our main component is an Atmega328p, it is 28 pin IC, commonly used for the arduino development board, it is low power low consumption microcontroller IC and we are connecting the all the components in this IC.

ULN2003 IC is the most common used for a motor driver IC if we need to connect motor we need to use this driver. By using it we connecting the two stepper motor at the time.

L293D, it is also the motor driver IC, by using this IC we able to connect DC motors. It receives the signals from microcontroller and then transmits the signal to our respective motor.

RS485 and RS232 connected to each other for connecting to the DB9 connector to the computer.

PCF8574, in the market this board is available very less time we work with IC and we are also work with IC. It is a I2C bus. We are using this device to provide the remote I/O expansion for a microcontroller. it's job is to expand the IO capabilities of a microcontroller that's why we use it.

DHT11 board it is a humidity humidity and temperature sensor. It help us to capacitive humidity sensor and thermistar to measure the temperature.

We are also using the Wi-Fi micro chip which is name is ESP8266, it is a low cost Wi-Fi micro-chip which is the working with the TCP/IP networking software. this small module allows the microcontroller to connect the Wi-Fi network and make a simple connection with TCP/IC network.

We are connecting the microcontroller and DHT11 to LCD which gives a message in it.

6. LITERATURE REVIEW

Developed IoT Based Boards for Smart Healthcare System[1]. An IoT is amplifying, proportional to that various development boards had been developed and they now being employed in the field of medicine to make the medical operations convenient to people. These type of boards are reduce the effort of the people, are cost-effective and utilize low power. This paper gives an aspects of IoT driven healthcare systems and the different development boards which enable connectivity between devices and people. This system track and sense the signals in real-time and send to the desired person be it a doctor or family member, etc., for immediate assist to it. The purpose of this board is basically to connect many of devices and people for the welfare of the people. Also, this board with the integrate of AI can also provide a level diagnostic to the patient. The paper gives a how IoT used in Health care system.

An IoT home monitoring system with an FPGA development board [2], The board was constructed using a temperature sensor (DS18B20) paired with the RS485 interface (Fig.2). The system consists different parts. The first part is sensors. The second part consists of the gateway, which in this case is an Altera FPGA development board for enabling communication between the sensors and virtual server. The virtual server is third part, which provides various services for the IoT system. And the last one is the application or webpage, which operate by using mobile or browser. A FPGA development board is used to enable communication in the sensing, network, and application layers. The main function of this system integration is to reduce hardware devices as well as maintenance with easy debugging. The real-time sensing data and the current status of the linked devices can be viewed through the webpage and used to control the devices.

MINI11-Microcontroller Development Board for SCL(Student Center Learning) Approach [3]. In this board is designed around a 48-pin DIP MC68HC11E1 chip. An 8MHz crystal is used in clock circuit for produce a 2MHz clock for the microcontroller. Reset circuit which is push button switch provides manual reset capability for any system to be designed. VO ports of MC68HC 11 E I are connected to connector sockets for simplicity of interfacing with various VO devices. Hence the development board is designed for bootstrap mode, all ports can be explored. The result of a prototype of MINI-II development board was built for testing purposes.

As microcontroller based system demand increases specially in automotive and industrial consumer market creates challenge for to produce engineers practical embedded system development and programming skills[3]. MINI-II development board for M68HC11 microcontroller is designed specifically for this types of new approach in teaching field. Provide with an easy to used integrated software development environment feasibility program, MINI-11 can be used to develop microcontroller-based application system of different complication. A prototype of MINI-II development board had been designed, developed, tested and verified for that motive. MINI-II board was expanded by adding memory modules . A Review of Low Cost and Power Efficient Development Boards for IoT Applications [4], In this paper, provided a complete review of the six different IoT boards - Raspberry Pi; BeagleBoneBlack; UDOO x86; Arduino; Intel Galileo; Tessel 2.

All of these boards provide us smart, efficient and a reliable platform for development of the IoT applications. The updated versions of these boards are being istablished in the market as per the requirements of IoT. All of these six boards, Raspberry Pi 3 is the most flexible and suitable board for development. The reasons are, its cheaper price of \$35, numerous connectivity options, vast range of Operating System(OS) support. Due to the popularity of the Raspberry Pi 3, a lot of libraries for various hardware are already available on the internet to make it easy for developers to start. In future we are working on a Home Automation Project using Raspberry

Pi and Arduinos for developing a server which works online as well as offline beyond the router in case of internet failure[4]. Out of the six boards, take a look of Intel Edison Kit for Arduino Universal Development Board for Education in Embedded Systems [5]. This board has a similar layout with universal module for control of mechatronic systems. Only RS232 interface connector and its associate chip and 5 leds added, the other components carry on their original positions. This led to lessened development time for printed circuit board. Removing the fine-pitch microcontroller lead also to an ease to manufacture motherboard, because copper traces and global spacing can have now 16 mils instead of 10 mils. The example of universal board, the PIC16F876 daughter board was plugged into motherboard.

A Review Paper on Development of General Purpose Controller Board [6], This paper demonstrate the design and development of a controller board with different peripherals for a different set of applications. It is portable. A general purpose controller board is basically a controller board which allow its use in distinct applications, which is eventually point out its compatibility with different devices.

This controller board is designed in order to allow the microcontroller and devices to communicate with each other through a serial communication .It is an electronic platform establish to use hardware and software easily .The function performed which is microcontroller by using a set of instructions.

7. CONCLUSION

We have studied various type of paper according to which arduino gives it the best accuracy and in arduino we were able to interfacing with the microcontroller just by connecting different boards but the board we made is multipurpose. In which we will use different types of motor with different drive which we have connected in same board. Wifi service is also available in it and at this time we will be able to connect multiple motors in it and LCD will provide us messaging service.

1. ADVANTAGES AND APPLICATION

7.1 Advantage

1. Low in cost
2. No need to Connect external components
3. This One PCB Board is made in India

7.2 Application

1. Cloud Data Manipulation for Industrial Data.
2. Arduin is an open-source electronics platform based on easy-to-use hardware and software.
3. Software loaded boards are connected to home devices like lamps,A/C, TV, Refrigerator, and Bluetooth software is interfaced with the board

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Library Management System Using RFID Technology

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I. INTRODUCTION

Radio frequency identification (RFID) the technologies uses the radio wave to automatically identify the individual items. The objective of any objective of RFID system it is carry to data in suitable transponders, generally known as tags and to retrieve data, by the machine readable means, it is suitable place and also the time to satisfy the particular application need.

RFID is one of the most technologies are adopted by the industries and academics worlds. The RFID are the modern technologies is a place where millions of the books in advanced; periodicals, CDs, DVDs, and other electronic reading material are contained. It is a challenged to manage for librarians, such type of huge collection.

RFID technology is in use since the 1970s. RFID tags can be active, semi-passive and passive. It is a small device that can be store information. Passive tags don't have internal batteries. RFID reader is a device can restore receive and transmit a radio signal.

RFID library management system are use as a library tags, it is convenient and also easy. RFID it consist of books, it is attached with an RFID tags, computer network and software, RFID reader. Library handle the staff like lending, sorting, tagging etc.

II. LITERATURE SURVEY

[1] Neha Firdaush Raun "Smart environment using internet of things (IOTS) - a review" Published in 2016 IEEE 7th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON) This paper provides a broad overview on what is IOTS, different applications of IOTS, challenges and future scope of IOTS. A world where the real, digital and the virtual are converging to create smart environments that make energy, transport, cities and many other areas more intelligent.

[2]Madhvi A. Pradhan ; Supriya Patankar ; Akshay Shinde ; Virendra Shivarkar ; Prashant Phadatore "IoT for smart city: Improvising smart environment" 2017 International Conference on Energy, Communication, Data Analytics and Soft Computing (ICECDS) In this project we have developed a system smart city that is equipped with Internet of Things. System is also facilitated with different features like water pollution detection, weather monitoring, accident detection and video surveillance

[3] C. Tejaswini Roy; D. Sri Lakshmi; G. Anirudh Kumar; H. N. Vishwas "International Conference On Smart Technologies For Smart Nation (SmartTechCon)" 2017. Smart environment using IoT This paper describes an efficient pollution monitoring system which monitors the emissions from each vehicle on a daily basis and updates it to the web server so that respective action will be taken by the authorities. It uses GPRS/GSM, RFID, AWS i.e, Amazon web server.

[4] Amany Alnahdi; Shih-Hsi Liu "Mobile Internet of Things (MIoT) and Its Applications for Smart Environments" Published in: 2017 IEEE International Congress on Internet of Things (ICIOT): In this paper, we propose a new model for IoT that provides mobility in terms of location change. In addition, we propose our positional view of the components of Mobile IoT model. Moreover, we provide scenario applications for Mobile IoT uses.

[5] Neeharika Cherukutota ; Shraddha Jadhav "Architectural framework of smart water meter reading system in IoT environment", 2016 International Conference on Communication and Signal Processing (ICCSP) Internet of Things (IoT) has provided promising opportunities to create powerful industrial and domestic applications. One of its main applications is smart metering. Water is the most precious resource that must be used responsibly. Information about the usage of water can reduce the water wastage and will help in water management

III. METHODOLOGY

- We are using the wireless sensor method in this project.
- (WSN) WIRELESS SENSOR NETWORK A wireless sensor network is a network which consist separately distributed autonomous device using sensors to monitor physical or environmental conditions

- It is a group of specialized transducer with a communication infrastructure for monitoring conditions at diverse location.
- Bus topologies bus network uses a multi drop transmission medium, all node on the network share a common bus and thus share an information.

Plan of Project Work

Activity	Project Phase I Activities			Project Phase II Activities			
	July 19 - Aug19	Sept 19- Oct19	15 Oct. 2019	Oct 19- Nov19	Dec 19- Jan 20	Feb20- March20	15 Apr20
Literature Survey							
Study of relevant and other specification & Comparative Study							
Conclusions							
Preparation of Project Report							

IV. PROPOSED SYSTEM

An easy way to comply with the conference paper formatting requirements is to use this document as a template and simply type your text into it. The current library systems are employed with barcode technology. Every book in the library is provided with a barcode. The uniqueness of the barcode varies with the thickness of the lines. This type of library management requires manual control. All the major functions of the library such as issuing, reissuing and returning of books needs to be monitored and controlled manually. The barcode readers have the capability to read only one code at a time and therefore at most occasions it leads to a long queue at the issue and return counters. The barcodes need to be programmed at the time of manufacture and these codes can be programmed only once. Once defined the properties of the codes cannot be altered. The codes are printed on a piece of paper and pasted on the code.

During both issue and return of the books the bar-code reader should have direct line of contact with the bar code. For making this possible it is compulsory to make the operation manual. Even under manual operation it is very tedious and time consuming process since each time the reader needs to be placed very near to the barcode tag for the book to be read properly. The bar-code readers have a very small read range of about very few to make the job tiresome.

Drawbacks of Barcode Technology

- Barcode readers require a direct line of sight, using laser technology
- Scan and read one tag at a time and also time consuming
- Human intervention is required to scan a barcode
- It should be visible on the product for scanning
- Does not have read/write memory.

VI. FUTURE SCOPE

- Patrons will spend less time waiting in check-out lines by using Self Check in - Check out systems.
- Patrons find what they are looking for quickly & easily.
- Reminders for due dates allows patrons to submit borrowed materials in time.
- Use of book drops & returns chutes for returning library material allows for flexible timings.
- RFID enabled patron cards allows for easy patron identification.

V. RESULT AND DISCUSSION

- Every book in the library and the ID cards of the users must be embedded with the RFID tags.
- The readers must be installed at the entry and exit doors of the library.
- A PC must be installed and programmed such that it enables for book search or availability of books.
- A hand-held reader must be programmed to detect and identify if any misplacement of books happen.

VII. CONCLUSION

The cost of in itialisation of RFID based library is high but the cost of maintenance and time consumption of the se libraries are reduced. RFID technology is believed to take off in libraries at an increasingly rapid pace. The RFID tag contents will increase in power, prices are expected to decline and tag will dramatically improve its efficiency, security and accuracy.

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Smart City Tech to Fixed Railroad Crossing Traffic

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INTRODUCTION

Railroad is the most commonly used mode of transportation in the world and in India, a country with the largest railway system in the world, with the exception of several railways that run the right way every day. Recognizing that it can be difficult to stop a train every second, therefore the railway lines have provided the railway gates to be properly connected at the intersection level. At intersections the access roads are close to traffic congestion, you need to stay on the right lane in order to open up lanes for street customers. The degree intersection in India can be divided into a system of two human and non-human systems and kept an eye on the intersection, where it is protected by gatekeepers as representatives of the railway line.

Traffic accidents and violation of traffic rules have increased at great extent. Even in our daily life we come across many problems caused due to traffic rule violation by someone. These problem cause disturbance to entire system and also consumes our valuable time. Traffic is major issue we are facing today. People are too impatient to wait at signal. Instead of waiting they prefer to cross or break the signal. Similar incidence happen at railway crossing. When train is at some distance about to pass the crossing, the barrier or gate close for the vehicles on both side of crossing.

When gate is closed, people need to stay at the both side of road until the train pass the crossing. But some people violate the rule and act differently for this situation. Some of them want to go early, and that is why they stand their vehicles at empty lane(wrong side) which is for the vehicles on other side of crossing. Vehicles on wrong lane block the path for vehicles on other side of crossing. This may results in heavy traffic at crossing.

This traffic will be dangerous for vehicles if another train came on same track. To avoid heavy traffic at crossing we are proposing the system which can detect vehicles standing on wrong lane or blocking the path of vehicles on other side. This system will able to detect the vehicles on wrong lane of the road and produce a audio warning for them. After an audio warning if people will stay on wrong side then system keep the gate or barrier remain closed. Once they move their vehicles and path is clear then only system will open gate for vehicles to cross.

LITERATURE SURVEY

Barry Jesia G and Harrison James E (2008), he entitled "Series of injury because of Transport Accidents Involving Railway Train", he analyzed and compared the train accidents, hospitalization keep, etc. It gets in to additional description of statistics. The danger of significant injury, based on distance cosmopolitan, is ten times bigger for passengers travel by automotive compared with passengers travelling by rail. The mean length of keep in hospital for a transport accident involving a railway train was four days that were longer than the mean length of keep for all External causes of injury [1].

Zuhairi Mahdi Al- Ahmed Salih (2013), the research paper is about "Automatic Railway Gate and crossing control based sensors and microcontroller", he provides some solutions to minimize rail traffic accidents and discusses that this is dangerous than other transportation accidents in terms of severity and death rate etc. Therefore more efforts are necessary for improving safety. There are many Railways crossing which are unmanned due to lack of manpower needed to fulfill the demand. Hence many accidents occur at such crossing since there is no one to take care of the functioning of the railway gate when a train approaches the crossing .The main objectives of this Paper is to manage the control system of railway gate using microcontroller [2].

Anil M.D.et al (2014), he discussed about "Advanced Railway accident prevention System Using Sensor Network" in that he talk about increased rail traffic density across the world and in such circumstances how to control. This system makes uses of IR sensors, fire sensor, Zigbee and embedded systems which prevent accident. When the train arrival at a distinctive side then transmitter IR sensors create their suitable hint and then at the equal time the receiver IR sensor receives their indication and makes railway into stopping position [3].

Ramesh S. Et al (2014) explained "Automatic track inspection in railway network", he stresses the reliability on safety Parameters in Indian rail system thereby causing rail accidents. The main problems about railway analysis is detection of crack in the structure .this project proposes a cost effective solution to the problem of

railway track crack detection utilizing RF control assembly which track the exact location of faulty track which then mended immediately so that many lives will be saved [5].

M Kiruthigaet al (2014) researched on "Wireless communication system for railway signal automation at unmanned level". He analyzes the accidents at unmanned level crossing and collision of trains running on same track where the accidents are more in railway. Such accidents cause heavy human causality and damage to train. Therefore he proposed to develop full proof system to avoid such accidents. Automatic closure of unmanned gate reduces the time for which the gate is being kept closed and provides safety to the road users by reducing accidents [6].

Bhosale Amol Ankush (2015) discusses about "Automotive Railway Safety and Control using RF model". He emphasizes about various control measures such as in case emergency, fire in the bogie etc. Railway accidents are often taking place. There are different reasons of railway accident. Railways being cheapest mode of transportation are preferred over all other means. Rail Accidents are very big economic losses are to be faced. The objective of the author is to avoid railway accidents. This model is designed with the help of microcontroller to avoid accidents [7].

METHODOLOGY

We are going to monitor traffic at railway crossing and have tried to eliminate it. We will use camera for the image capturing. We select the spot where camera going to fix. After installing camera we will define the area from where we want to eliminate vehicles. That area is called region of interest (ROI). This area is on both side of the track. Our main objective is to detect vehicles on ROI after red light signal at crossing.

If there any vehicle on ROI area after the red light then an audio will play to notify them that they are on wrong side and please move your vehicles backward and make that area clear for the other side of vehicles. After an audio signal if vehicles remains at their initial place then boom barrier (railway crossing gate) will remain closed and red light signal will be continue to glow.

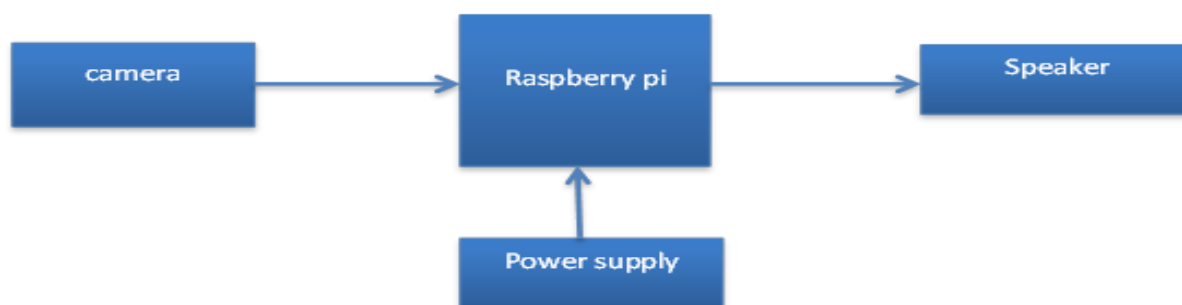
This is the indication that they need to move their vehicles so that light turns green again. Gate will remain closed until vehicles clear the ROI area. Once vehicles clear the ROI area then red light will turn off and Green light will glow to indicate path is clear to go. As soon as green light will turn ON, barrier or gate will open for vehicles to cross the railway track. If there will be no vehicle to detect on ROI area then after passing the train green light will turn ON and gate will directly open without any audio indication.

As soon as system started camera will start capturing images. We have created an area from where we want to eliminate vehicle or detect vehicles. That area is called region of interest (ROI). If object is inside the region of interest, Audio alert will get triggered. The objects we are talking about are vehicles. For object detection we have used yolo.

An audio will generate if detection result is positive. During red light at rail gate crossing if vehicles found in are of region or ROI then a alarm or voice notification is trigger which will warn the vehicle or instruct them to clear RIO. Until the ROI area get cleared red light or red LED will continue to glow and no one can able to cross the track. As soon as ROI get cleared green light or green LED will turn ON which is the indication for opening the gate and vehicles can cross the rail track.

PROPOSE SYSTEM

For this proposed system we need camera to capture vehicles which are on the wrong side of the road blocking the path for vehicles on other side. The area that we are going to monitor for vehicle detection is called region of interest. This image is then processed in the raspberry pi processor which is a small computer. Detection and identification of vehicles done in the controller and depending upon the result controller give command to the speaker to generate an audio signal. For uninterrupted operation we need power backup or battery.



FUTURE SCOPE

Traffic is the biggest issue we face today. People are getting so impatient that they can't wait to talk. Instead of waiting they prefer to skip or break the signal. Similar incidents occur at the crossing of the railway line. Cars on the wrong lane block the path of vehicles on the other side of the crossing. This can cause traffic jams when you cross. This overcrowding will be dangerous for cars if another train can reach the same route. To avoid traffic jams, it is suggested that you may be able to detect incoming traffic or obstruct traffic. Therefore we need a system that can help to eliminate these problems. So our ultimate aim is to design a system for Smart City Tech to Fix Railroad Crossing Traffic. In future we can detect number plate of the vehicle so that we could identify the user and if needed we can fine to that user to violation of traffic rule.

RESULT AND DISCUSSION

The system has detected vehicles in ROI. The red area is region of interest from which system have to detect object or vehicles

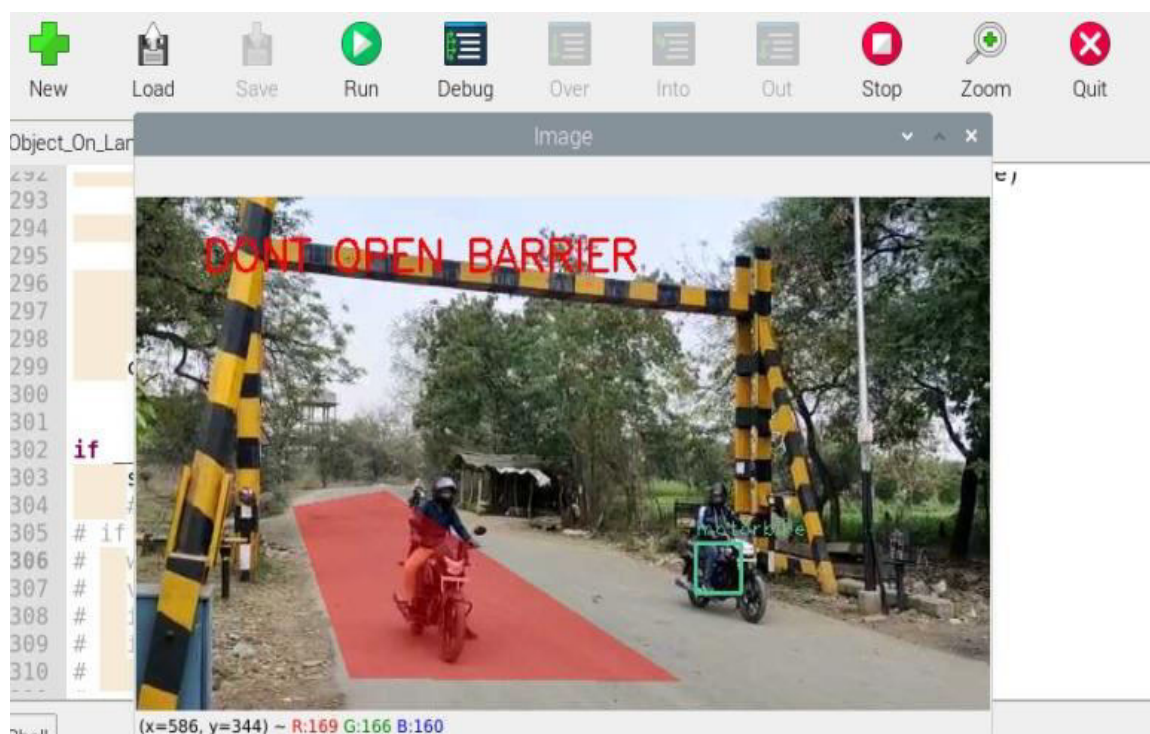


Fig.7.1 Region of Interest

When there is a vehicle on ROI area after the red light turned ON then an audio signal has play to notify them that they are on wrong side and please move your vehicles backward and make that area clear for the other side of vehicles.

After an audio signal if vehicles remains at their initial place then boom barrier (railway crossing gate) will remain closed and red light signal will be continue to glow. This is the indication that they need to move their vehicles so that light turns green again.

Gate will remain closed until vehicles clear the ROI area. If there will be no vehicle to detect on ROI area then after passing the train green light will turn ON and gate will directly open without any audio indication.

In the above result the person with his vehicle detected inside the region of interest. Hence an audio is played to warn that person.

CONCLUSION

With implementation of this system the manual work will be reduced, even the human limitation will be effectively overcome. Now the window of getting away from the violators due to negligence will be narrowed. More violators can be scanned. We will be working towards an automated environment which reduces the workload on police officers too, now the workflow will become efficient. With inculcation of this new system rule will be enforced more actively and decrease the road accidents and casualties. Thus far the system will be automated. Workflow will be efficient. Rule enforcement will decrease the road accidents and casualties. This offers associate secure model for the railway track system. This method will contribute a lot of profit either to the road users or to the railway management.

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Improved River Cleaning System

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ABSTRACT

The goal of this project is to develop and build a river waste cleaning machine. The operation was done in response to the current state of our major rivers, which are dumping crores of litres of sewage and are clogged with pollutants, harmful compounds, and debris. The Indian government has taken steps to clean rivers and has invested significant funds in projects such as "NamamiGange," "Narmada Bachao," and other major and medium initiatives in places such as Ahmadabad and Varanasi. Taking this into account, this machine was created to clean the surface of river water.

In large production, automation is extremely crucial. We built the river cleaning machine for this project. The project's major goal was to develop an electronic as well as a mechanically simple system that would save both manpower and time when cleaning water bodies. With the help of a motor and chain drive arrangement, we have mechanised the process of river cleaning in this model. The following are some automation requirements. The cleaning machine is driven by motors in this case. We employed cutting-edge IoT technology to create an easy-to-use system.

Keywords: Conveyor, Node Mcu, Garbage Collecting Tank, IOT, DC Motor.

INTRODUCTION

The "River cleanup machine" is used in that places where there is garbage in the water body which are to be cleaned. This machine is made up of a conveyor mechanism which collects & eliminates the wastage, garbage & plastic bags from water bodies. This also decreases the problem which we face when collection of garbage takes place. A machine will collect the waste surface debris from the river, this will surely result in decrease of water pollution and finally the aquatic animal's death problems will be reduced. It consists of a belt drive mechanism which lifts the debris from the river. The use of this project will be made in rivers, ponds, lakes and other water bodies for to clean the surface water debris from bodies. Similarly there are lots of problems of water pollution under Naag River, Nagpur which affect the acoustic, human life & beauty of River. The some photo graphs are shows the water pollution near Naag River Nagpur.

Contaminated water is defined as the flow of used water from house, industries, commercial activities and institutions which are subjected to the treatment plants by a carefully designed and engineered network of pipes. The biggest impact of cleaning the water wastes can cause respiratory diseases and it plays a challenging issue for the municipality officers. Water damage is classified as three types of contaminated water. They are named as gray water, black water and clean water. Clean water comes from a broken water taps line or leaking faucet. If not treated quickly, this water can change into black water or gray water, depending on length of time, temperature, and contact with surrounding garbage.



Fig: Water pollution

A drainage gutter is a small passage that's dug at the side of a road or field to take down the water. These days, indeed though robotization plays a big part in all artificial operations in the right disposal of scrap from

diligence and sewage cleaning is still a grueling task. Drainage pipes are used for the disposal of sewage and unfortunately occasionally there may be loss of mortal life while drawing the blockages in the drainage pipes. The megacity workers are only responsible to insure that the sewage is clean or not. Though they clean the dikes at the side of structures, they can't clean in veritably wide sewages. The megacity workers need to get down into the sewage sludge to clean the wide sewage. It impacts their health poorly and also causes skin disinclinations.

LITERATURE REVIEW

Mr. Abhijeet, M. Ballade, Mr. Vishal.S. Garde, Mr. Akash.S. Lahane and Mr. Pranav.V. Boob Design & Fabrication of river cleaning system: India is a holy country, and there is a lot of water pollution in the Godavari River in Nashik during many festivals such as Ganeshvisarjan, Navratridurgapuja, and especially Siahnsthkumbhmela. Water pollution is a major issue in rivers, ponds, and other bodies of water along the Godavari River in Nashik. Water contamination in the form of waste material is causing problems for aquatic animals and putting their lives in jeopardy. Similarly, aquatic creatures sometimes mistakenly ingest surface garbage as food, resulting in animal mortality. Many skin illnesses have been seen in humans as a result of polluted water. We are attempting to create a river cleanup equipment in order to prevent water pollution. "River cleanup machine" is a machine that removes waste particles from the water surface and disposes of it safely.

C. Manoj Kumar, M. Mohamed Idhris, M. Elamparthi Mr. K. Suganeswaran, Mr. S. Arun Kumar, Dr.N. Nithyavathy Remote Controlled Sewage Cleaning Machine: Design and Fabrication The goal of the project is to automate the sewage cleaning process in drainage systems in order to reduce disease transmission to humans. By removing leftovers that can attract and nourish bugs, the black water cleaning method helps to avoid insect infestations. It also extends the shelf life and improves the sensory quality of food. The machine is controlled remotely in the planned system to clean the sewage. As a result, this system mitigates the negative effects of sewage waste and its toxic gases.

Shrutika Pawar, 'Remote Operated Floating River Cleaning Machine': The "Remote Operated Floating River Cleaning Machine" is the centrepiece of this project. Water pollution is becoming a severe concern for rivers, ponds, and other bodies of water in India. Impurities such as waste water detritus, plastics, and garbage float on the surface of the water. These contaminants have a significant impact on human health as well as aquatic animal life. Because this project is based on renewable energy sources, nonrenewable energy sources such as oil, petroleum, electricity, and all types of mineral sources are used less frequently. Nonrenewable energy sources are thus conserved. As a result, this effort contributes to the reduction of water pollution on floating bodies.

Aniket Puthran, et al., 'Review on Design and Fabrication of Floating Waste Collector': All humans require water to survive. However, numerous water bodies have been polluted in recent years due to a variety of factors. It could be caused by human waste, or it could be caused by natural waste in some situations. These bodies of water are contaminated and unfit for human consumption. The government has made a number of initiatives to clean up these bodies of water. The cleanup has required a significant financial commitment. The initiative was created with this in mind in order to reduce the government's expense of cleaning the lake. The money may be put to better use for the country and its citizens. This project will encourage visitors to take a boat ride over the water while visiting rivers and lakes.

R. Raghavi, et al., 'Water Surface Cleaning Robot': All living things require clean water to survive. It is impossible to survive on Earth without water. Water covers around 70% of the Earth's surface, but just 3% of it is pure water. Water pollution can occur for a variety of reasons, including industrial waste, sewage waste, and rubbish waste. As a result, it is critical to keep water clean and sanitary. We saw water contamination as a severe problem and began working on a solution. To do the task successfully and efficiently, we opted to use technology. The architecture of our invention is such that it catches waste that floats in water bodies. Almost everyone nowadays is familiar with robots. We are planning to create an RF controlled robot that will be quite interesting. It is critical to keep track of a water body's pH. A change in a water body's typical pH can indicate increased pollution or other environmental problems. As a result, pH sensors measure the solubility and biological availability of water's chemical contents..

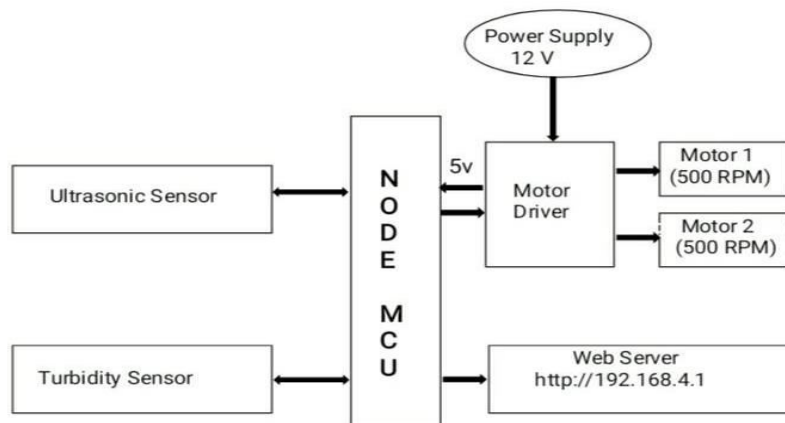
Puneeth E Raikar, et al., 'Lake Health Monitoring and Waste Collecting Aquabot': The design and manufacture of a river trash cleaning machine are the focus of this paper. The inspiration for the idea came from the current state of our national waterways, which are dumping billions of litres of sewage and are clogged with

pollutants, harmful compounds, and debris. The Indian government has assumed care of river cleaning and has invested a significant amount of money in programmes such as "NamamiGange," "Narmada Bachao," and other major and medium initiatives in cities such as Ahmadabad and Varanasi. Taking this into account, this machine was created to clean the surface of river water. Almost every manufacturing process is being atomized these days in order to provide products faster. In large production, automation is extremely crucial. We built a remote-controlled river cleaning machine for this project. The project's major goal is to reduce the amount of manpower and time spent cleaning the river. With the help of a motor and a partially submerged cage arrangement, we were able to automate the operation of river cleaning in this project. Below are some automation requirements. The cleaning equipment is controlled via an RF transmitter and receiver. Computers, hydraulics, pneumatics, robotics, and other types of automation can all be used; however, robotics is a particularly appealing medium for low-cost automation.

Aishwarya N. A., et al., 'Detection and Removal of Floating Wastes on Water Bodies': With As the population grows, the state of cleanliness in terms of waste management is rapidly deteriorating. The overflow of garbage along the riverbank produces an unsanitary environment in the area. The floating bodies in river water will produce a serious environmental hazard and pose a significant risk to the future. These floating pollutants are difficult to dissolve in water. As a result, these undesired floating particles cut off oxygen, resulting in oxygen shortage, which has a direct impact on marine life. Furthermore, these wastes endanger aquatic animals. Our idea seeks to use an infrared sensor to identify floating garbage in water and clean it efficiently. GSM will be used to send information on each activity taken to the appropriate authority. Both moving and stagnant water can be treated with this project. The project's main benefit is that instead of having to walk to every nook and cranny to clean garbage, control station personnel can conveniently monitor from one end. Finally, all floating waste will be removed from the water bodies, and the river's sanity, as well as the lives of its dependant living species, will be preserved.

METHODOLOGY

This section provides a detailed description of the proposed approach to outliers. recognition. Methodologies and procedure flow charts to solve the following problems show the order Actions / steps performed during the project process. The methodology shows how to work systematically. This is a standard process for describing a process. The easiest way to do it. Design is an application of scientific principles and techniques Information and imagination to develop new mechanisms to perform specific functions The whole design work was divided into two parts. 1. System design 2. Mechanical design



Block Diagram of Improved River Cleaning System

APPLICATIONS

- 1) Applicable in pond, river and sea.
- 2) It is applicable to reduce water pollution in rivers & ponds.
- 3) It is useful to remove the sediments present in swimming pool to keep it clean.
- 4) It is applicable to reduce water pollution in river, ponds and oceans.
- 5) It is used to reduce the environmental marine pollution at river.
- 6) To clean the garbage present in small and big water bodies.

FUTURE SCOPE

In future this design can be bettered to sort further orders of waste. In this system we can use advance conveyor system and conveyor material for adding the effectiveness of collection of scrap. We can use the solar panel for furnishing power to the boat rather of battery operation. To change the size of boat according to the waste collecting capacity is increases. This design makes only for small lake by doing some revision in its size and capacity it can use in big lake and swash like Ganga.

CONCLUSION

Based on a thorough literature review, we find that it is a new approach of reducing manual work that is effective in maintaining the rubbish level in water bodies. The project we are working on will have a significant environmental impact and will be extremely valuable for small-scale sewage treatment operations. This idea is simple and inexpensive, and it has a lot of potential to become more cost-effective. The goal of this project, "Improved River Cleaning Machine," is to make it particularly useful in cleaning rivers and ponds. It is very cheap and very valuable for society based on its design and predicted cost and availability. Some of the reviews are favourable, but not sufficient. We some new Technology (IoT) to Make a Project easier to operate. The objective of the project is achieve successfully.

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Design and Implementation of Real Time Health Monitoring Care Unit Using IoT

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ABSTRACT

The body sensor network automation is a specific core technology of IoT domain in healthcare technique, where a sick person can be tracked of his/her health using a collection of body parameters with the use of minute powered and flimsy wireless sensor nodes. The largely imperative intent of the endeavor was to craft a distant health care system. It's comprised of three focal sections. The earliest section being, revealing of patient's vitals via sensors, second for conveyance information to obscure storage and the third bit was providing the detect information for secluded performance. Secluded performance of the information enables a practitioner or custodian to scrutinize a patient's well-being progress missing from sanatorium property.

The topical advancement in expertise and the accessibility of the Internet make it feasible to hook up a variety of campaign that can converse with each other and allocate data. Internet of Things (IoT) can be defined as the wireless unification of campaign which are allied to each other to allocate information and data in bid to commune and construct new information so as to trace and analyze it for hope exploit. The anticipated sculpt enable user to perk up health concurrent risk and shrink healthcare expenditure by collect, footage, analyzing and partaking huge information stream in genuine instance and ably. The notion of this venture come so to ease the nuisance of serene to break to practitioner each occasion he necessitates to ensure his blood pressure, pulse rate, temperature and so forth.

Keywords: Internet of Things (IoT), Arduino Uno, Blynk IOT

1. INTRODUCTION

Due to the hi-tech advance in the present day, there is huge assortment successively feeler construal imperative cipher such as blood pressure, heart rate monitor, counting electrocardiograms, which tolerate patients to take their crucial cryptogram day by day. The interpretations which are engaged on a daily basis are remitting to doctors and they will counsel the linctus and drills routine that allow them to progress the worth of life and surmount such disease. The internet of things applied to the heed and monitoring of patients. This manuscript proposes a vigour monitoring system which is capable of detecting manifold stricture of our body such as blood pressure, temperature, heart rate. An incessant record of body can be used to distinguish an illness in more competent way. Anticipated system consists of a temperature, blood pressure, pulse sensor, and Arduino system is competent of measure pulse rate, temperature and blood pressure of infant to ripened person. Low cost of contrivance assists to grant apposite handy inaccessible base effectual heart rate monitoring system. Now, Internet of Things (IoT) has become one of the most authoritative communication paradigms of the 21st century. It is chiefly a compilation of low-power and glare credibility wireless sensor nodes that are used to scrutinize the human body function and contiguous environment. Since BSN nodes are used to accumulate perceptive (life-critical) information and may manoeuvre in antagonistic environments. consequently, they entail austere refuge mechanism to prevent cruel dealings with the system.

2. SYSTEM ARCHITECHTURE

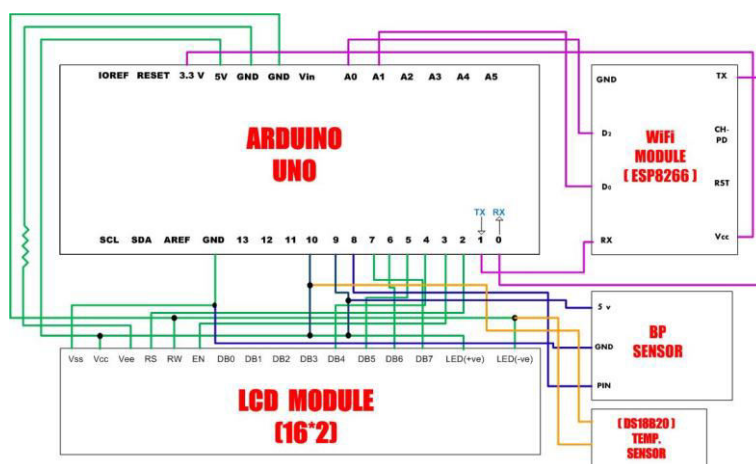


Fig: Hardware Model

The universal intend of IoT application can be partition into three Layers: the detecting layer, the convey stratum and the application layer. In the Detecting layer to appraise the body temperature we Utilized DS18B20 body water contravene body temperature feeler. To assess the heart beat Rate of the patient by utilizing pulse sensor amped is utilized. It has its own fastidious an envisage to depiction the heart beat waveform, BPM. It gives the data about whether the patient is sitting, resting, sleeping, walking, jumping or frontbend and diverse circumstances. To recognize the Blood pressure and Pulse rate we utilized sunrom BP sensor. This Bio data from the sensors is tartan unremittingly in Arduino utilizing the consecutive scrutinize. In the Transport layer we remit the information to the cloud by utilizing the Arduino with the aid of Wi-Fi Module ESP8266.

Here we make use of the open cloud server i.e. "Thingspeak" to build it easily reached in cloud, with the end target that the data can be go to anywhere on the planet. Here in the Thingspeak server we make an own account and we make a our private channel by the name of our collage. So by making the own channel we get a remarkable id and API-key to compose the information to the cloud. This API key is use while programming in Arduino with the purpose that the information is put in the server and at the application layer we can recover the information by the use of one of a kind API key to such an extent that the information can be obtained from the server. The proposed health monitoring system that enough to monitor the patient automatically using IoT. It collects the status information through these systems by including patients heart bit rate, blood pressure and temperature and sends it on Thingspeak with his current status and full medical information. This would help to the doctor to monitor his patient from any-where and anytime and also to send to patient his health status directly without visiting to the hospital. This system can be deployed at various hospitals and medical institutes for reducing the time. The system uses smart sensors that generates the data information and collected from each sensor and send it to a database server i.e. hospital where the data can be further analysed and maintained to be used for the medical experts.

3. PATIENT MONITORING ELEMENTS

A. Body Temperature Sensor

The DS18B20 is the one of the best reasonable sensor for measuring the human body temperature (exact to $\pm 0.5^{\circ}\text{C}$ over the extent of -55°C to $+125^{\circ}\text{C}$). We can put these sensors at different spots of the human body like on forehead, under arms and even under the tongue on account of its waterproof. The DS18B20 has three wires i.e. VCC, GND, DATA are mounted in a solitary wire. The DS18B20 uses Maxims exclusive 1-Wire bus protocol that implements bus communication using one control signal. The control line requires a weak pullup resistor since all devices are linked to the bus via a 3-state or open-drain port (the DQ pin in the case of the DS18B20). In this bus system, the microprocessor (the master device) identifies and addresses devices on the bus using each devices unique 64-bit code. Because each device has a unique code, the number of devices that can be addressed on one bus is virtually unlimited. The 1-Wire bus protocol, including detailed explanations of the commands and time slots, is covered in the 1-Wire Bus System section. Another feature of the DS18B20 is the ability to operate without an external power supply. The core functionality of the DS18B20 is its direct-to-digital temperature sensor. The resolution of the temperature sensor is user-configurable to 9, 10, 11, or 12 bits, corresponding to increments of 0.5C, 0.25C, 0.125C, and 0.0625C, respectively. The default resolution at power-up is 12-bit.



Fig-2: DS18B20 Temperature Sensor

If the DS18B20 is configured for 12-bit resolution, all bits in the temperature register will contain valid data. For 11-bit resolution, bit 0 is undefined. For 10-bit resolution, bits 1 and 0 are undefined, and for 9-bit resolution bits 2, 1, and 0 are undefined. Table 1 gives examples of digital output data and the corresponding temperature reading for 12-bit resolution conversions.

Applications

Since each DS18B20 contains an ideal silicon serial number, more numerous DS18B20s can exist on the same 1Wire transport. This considers putting temperature sensors in a wide range of spots. Applications where this component is valuable incorporate HVAC natural controls, detecting temperatures inside structures, gear or apparatus, and process checking and control.

B. Sunrom Blood Pressure and Pulse Sensor

This sensor is has Intelligent automatic compression and decompression system which makes it easy to operate with switching button to start the measurements with Large-scale digital liquid crystal display screen.

It plant on 200mA regulated current from 5v power supply. Its Output Format is Serial Data at 9600 baud rate (8 bits data, No parity, 1 stop bits). Outputs three parameters in ASCII. Blood pressure is the fretfulness of the blood in the arteries as it is pumped around the body by the heart.

When your heart beats, it contracts and pushes blood through the arteries to the respite of your body. This oblige creates pressure on the arteries. Blood pressure is recorded as two figures the systolic anxiety (as the heart beats) over the diastolic anxiety (as the heart relaxes between beats). The unit which course this is called Sphygmomanometer. Monitoring blood pressure at home is imperative for many people, chiefly if you have high blood pressure. Blood pressure does not reside the same all the instant. It changes to convention your body's wants. It is pretentious by assorted factors counting body position, breathing or emotional state, exercise and sleep. It is best to appraise blood pressure when you are relaxed and sitting or lying down.

High blood pressure (hypertension) can pilot to solemn nuisance like heart attack, stroke or kidney disease. High blood pressure (hypertension) can lead to grave exertion like heart attack, stroke or kidney disease. High blood pressure usually does not have any symptoms, so you need to have your blood pressure chequered habitually.

Features

1. Intelligent involuntary compression and decompression
2. Easy to manoeuvre, switching button to start measuring
3. 60 store groups reminiscence measurements
4. Can interpret single or all measures
5. 3 minutes involuntary supremacy cutback appliance
6. Intelligent device debugging, routine clout to perceive
7. Local tests for: wrist fringe as 135-195mm
8. Large-scale digital liquid crystal flaunt screen, Easy to Read Display
9. Fully Automatic, Clinical Accuracy, High-accuracy
10. Power by External +5V DC
11. Serial output data for external circuit processing or display.

Specification

1. Working Voltage: +5V, 200mA regulated
2. Output Format: Serial Data at 9600 baud rate(8 bits data, No parity, 1 stop bits). Outputs three parameters in ASCII.
3. Sensing unit wire length is 2 meters



Fig-3: Sunrome BP and Pulse Rate Sensor

Electrical Characteristics

Vdd = 5V±5%
Vss = 0V

Item	Symbol	Condition	Standard value			Unit	Applicable terminal
			Min.	Typ.	Max.		
Power voltage	Vdd		4.5	5.00	5.5	V	Vdd
Input H - level voltage	VIH		2.2	—	Vdd	V	RS, R/W, E DB0—DB7
Input L - level voltage	VIL		-0.3	—	0.6	V	
Output H - level voltage	VOH	-IOH = 0.205mA	2.4	—	—	V	DB0—DB7
Output L - level voltage	VOL	IOL = 1.2mA	—	—	0.4	V	
I/O leakage current	IIL	Vin = 0-Vdd	-1	—	1.0	μA	RS, R/W, E DB0—DB7
Supply current	Idd	Vdd = 5V	2	—	—	mA	Vdd
LCD operating voltage	VLCD	Vdd-V0	3.0	—	11.0	V	V0

Sensor Pinouts

1. TX-OUT = Transmit output. Output serial data of 3V logic level usually connected to RXD pin of microcontroller/RS232/USB-UART.

2. +5V = Regulated 5V supply input. 3. GND = Board Common Ground. Classification of blood pressure for adults (18 years and older)

High blood pressure (hypertension) can lead to serious problems like heart attack, stroke or kidney disease. High blood pressure usually does not have any symptoms, so you need to have your blood pressure checked regularly.

Classification of Blood Pressure for Adults (18 Years and Older)

	Systolic (mm Hg)	Diastolic (mm Hg)
Hypotension	< 90	< 60
Desired	90-119	60-79
Prehypertension	120-139	80-89
Stage 1 Hypertension	140-159	90-99
Stage 2 Hypertension	160-179	100-109
Hypertensive Crisis	≥ 180	≥ 110

C. Wi-Fi Module ESP8266

The ESP8266 is low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller competence fashioned by Shanghai-based Chinese manufacturer, Express if Systems. The chip first came to the thought of western makers in August 2014 with the ESP-01 module, made by a third-party firm, Ai-Thinker.

The ESP8266 WiFi Module is a self-restricted SOC with incorporated TCP/IP protocol stack that can give any microcontroller entrée to your WiFi network. The ESP8266 is accomplished of either hosting an application or offloading all Wi-Fi networking functions from another claim workstation.

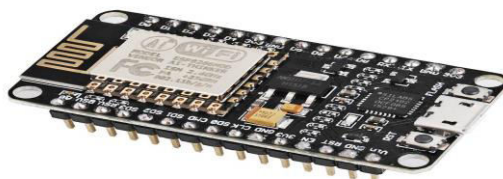


Fig-4: ESP8266 Wi-Fi Module

Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can merely clip this up to your Arduino contrivance and get about as much WiFi-ability as a WiFi shelter offers. The ESP8266 module is an exceedingly cost-effective timber with a colossal, and still budding, community.

ESP8266 Module Pin Description:

1. 3V3: - 3.3 V Power Pin.
2. GND: - Ground Pin.
3. RST: - Active Low Reset Pin.
4. EN: - Active High Enable Pin.
5. TX: - Serial Transmit Pin of UART.
6. RX: - Serial Receive Pin of UART.
7. GPIO0; GPIO2: - General Purpose I/O Pins.

Features

Processor: L106 32-bit RISC microprocessor core based on the TensilicaXtensa Diamond Standard 106Micro running at 80 MHz

1] Memory:

1. 32 KiB instruction RAM
2. 32 KiB instruction cache RAM
3. 80 KiB user-data RAM
4. 16 KiB ETS system-data RAM

2] External QSPI flash: up to 16 MiB is supported (512 KiB to 4 MiB typically included)

3] IEEE 802.11 b/g/n Wi-Fi

4. RESULTS

The graphical representation of the information of the patient-1 is demonstrated i.e. body temperature, Heartbeat, blood pressure are as showed up in the fig which is observed by signing into the Thingspeak server through a personal computer which has Time in x-axis and the parameter in y-axis

5. CONCLUSION

The proposed system collects the health status of a patient by connecting the different sensors to the body. The collected data is displayed on LCD and also stored in IoT server. The doctor can view the patients health condition by login into the web portal. From the evaluation and the result obtained from analysis, the system is better for patients and the doctor to improve their patients' medical evaluation.

6. FUTURE SCOPE

The system can be extended by adding more features to the mobile application like linking the ambulance services, leading doctor's list and their specialties, hospitals and their special facilities etc., Doctors can create awareness about diseases and their symptoms through the mobile application.

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